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Table of Contents

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ORIGINAL ARTICLES— Page

A Clinic for Adolescents: A Survey of 750 Patients, by Murray Williams 201
Scalene Node Biopsy, by D. C. Perry 207
Total Anomalous Pulmonary Venous Connexion, by M. J. Eadie, J. H. Hood, L. F. Masel, and M. E. B. Murphy 211
Congenital Dysplasia of the Hip, by G. S. Santow 216
Non-Visceral or Ectopic Calcification, by R. W. Thompson 217
The Place of Lumbar Discography in the Elucidation of Low Back Pain with or without Sciatica, by A. I. Rhydderch 219

REVIEWS—

Electrocardiography 220
The Guinea-Pig in Research 220
Essays on "The Welfare State" 221
Pathophysiology in Surgery 221
Clinical Proctology 221
Woman's Change of Life 221
Advances in Internal Medicine 221
Surgery for Students of Nursing 221
Insulin Crystals 222
Practical Clinical Biochemistry 222

BOOKS RECEIVED 222

LEADING ARTICLES—

Wound Healing 223

CURRENT COMMENT—

Adolescent Medicine 225
A New Test for Rheumatoid Arthritis 225

ABSTRACTS FROM MEDICAL LITERATURE— Page

Medicine 226

MEDICAL SOCIETIES—

Pædiatric Society of Victoria 228

OUT OF THE PAST 229

CORRESPONDENCE—

Be It Enacted 230
Carbromal and Bromvaletone 230
Triethylene Thiophosphoramide 230
Electro-Convulsive Therapy and Intravenous Anæsthesia 230
"Conquering Physical *Handicaps*" 231

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA 231

NOTES AND NEWS 231

***THE ROYAL AUSTRALASIAN* COLLEGE OF PHYSICIANS—**

Victorian State Committee 232

ROYAL AUSTRALASIAN COLLEGE OF SURGEONS—

Election of Office Bearers 232

NOMINATIONS AND ELECTIONS 232

DIARY FOR THE MONTH 232

MEDICAL APPOINTMENTS: IMPORTANT NOTICE . . 232

EDITORIAL NOTICES 232

A CLINIC FOR ADOLESCENTS: A SURVEY OF 750 PATIENTS.

By MURRAY WILLIAMS, M.B., B.S.,
Mitchell, Queensland.[1]

IN 1952 the Children's Medical Centre in Boston established an adolescent clinic which has become a large and important unit of this famous hospital. The clinic provides an out-patient facility for anyone between the ages of 12 and 21, and was set up because it was considered that the needs of this age group were poorly understood and often inadequately dealt with. It offers a comprehensive service to patients with all types of complaints, and various research projects have helped to clarify some of the problems encountered in adolescence. A programme of training for physicians has also been set up, in association with Harvard Medical School, which now offers post-graduate courses in adolescent medicine, as well as elective courses for its undergraduates (Harvard, 1957).

The clinic operates as a full-time out-patient division of the hospital, with a permanent staff of physicians, trainees and visitors. There is a panel of consultants in the various medical and surgical specialties, and there are several psychiatric associates. Clinical laboratory facilities, psychological testing, vocational counselling and social service are available, and various academic problems are studied by diagnostic and remedial workers. A programme of consultative seminars and conferences is arranged to provide teaching and discussion for staff and trainees.

The most important aim of the clinic is to provide for the adolescent a physician who is interested in him as a person, who is well acquainted with his problems, and who is able to gain his confidence and cooperation in therapeutic measures. These are, of course, the characteristics of any good doctor, and it may seem unnecessary to stress what is usually taken for granted. It is often recognized, however, that young people can be difficult to manage, and out-patient clinics in particular seldom offer adequate personal care of the kind described. The very gratifying response to the Adolescent Unit's approach suggests that it has satisfied many patients.

An informal, relaxed atmosphere is provided, in surroundings which are pleasant and comfortable. Visits are by appointment, and they are long enough to avoid the impression of haste and preoccupation often found in busy clinics. Parents are interviewed first, on a different day if possible, and a comprehensive history is obtained. At least an hour is allowed for the patient's first visit,

[1] Formerly Assistant Physician, Adolescent Unit, Children's Medical Centre, Boston.

and on this occasion he is seen alone, his own history is taken and a complete physical examination is carried out. Questions of personal and social adjustment are commonly touched upon, and considerable thought is given to establishing *rapport*. On subsequent visits the patient is encouraged to come alone, to take responsibility for his own treatment and appointments, and to respond to the physician as an individual in his own right — an arrangement which most adolescents appreciate and most parents approve if the doctor maintains adequate contact with them.

The patient is seen by the same doctor at each visit, and remains his responsibility throughout the course of his attendance. If specialist advice is required, physician and patient see the consultant together, but further management remains in the hands of the adolescent's own doctor. Careful explanation of treatment, tests and the details of his complaint help to capture the patient's interest and cooperation, and a good liaison with the family, the referring doctor, the school and other authorities when necessary helps to ensure a thorough understanding of each case.

In theory there is no selection of patients; but adolescents with acute infectious or traumatic conditions are usually dealt with by family physicians or emergency clinics; most of the boys and girls seen at the Adolescent Clinic complain of chronic problems, and a cross-section of these is discussed below. Growth and development, school, physical exertion, personal relationships and self-concern are important in the adolescent's life, and the patients also present psychosomatic symptoms, behaviour disturbances and various other conditions.

In training physicians to deal confidently with these problems, the advice and assistance of psychiatrists experienced in the field is most valuable. The unit's success confirms the belief that the general physician can provide very adequate care for patients with less severe disturbances having an emotional component. No attempt is made to deal with severe emotional problems, patients who display these being referred for psychiatric care; but ability to detect them, particularly in their early stages, is another benefit of competent psychiatric supervision. Furthermore, such supervision gives the doctor an excellent opportunity to learn more about himself, so that he may avoid emotional involvement with his patient (Aring, 1958). He is thus helped to use his medical knowledge more efficiently and with greater sensitivity and humanity. It is also possible for the physician to help the badly frightened adolescent towards accepting psychotherapy, should he need it, by gaining his confidence and helping him to understand what this involves. Thorough knowledge of physical conditions, however, together with careful and considerate physical examination, is naturally of first importance in unravelling the complex symptoms presented.

Selection also exists in the transfer of patients from special clinics of the children's hospital, such as those with seizures, congenital heart lesions and orthopædic problems, who have been followed there for many years and have now passed the age limit. The hospital's reputation in certain fields also draws new patients to the adolescent clinic for definitive diagnosis and treatment. The referring of severely delinquent or evidently psychotic adolescents is discouraged, because of the shortage of resources available for disposition of these patients.

Patients come to the Adolescent Clinic from the metropolitan area, from neighbouring towns and rural districts, and sometimes from other States. They are drawn from all social classes, and the parents' income determines the child's status as a private or a clinic patient. Clinic fees are reasonable, and they are graduated to meet the family's needs. Patients are referred by family doctors, schools, social agencies and other facilities, and are often referred back to their own doctors for follow-up care. Hospital beds, special laboratories and clinics of the Children's Medical Centre are available when required.

A Survey of 750 Clinic Patients.

This report covers 750 consecutive patients whom I saw in the period from January, 1956, to August, 1958. These patients represent a cross-section of the clinic population. All patients were seen once, the majority two or three times at least, and many were followed over a long period for continued supervision of treatment and to maintain a meaningful relationship where this seemed valuable.

The tabulated conditions are those determined as the principal diagnoses after each case had been studied; it is therefore likely that the presenting complaint — for example, school failure — sometimes differed from the final diagnosis, which may have been mental retardation. Diagnostic criteria are somewhat arbitrary in those conditions in which the physical component is minimal, and several diagnoses were necessary in numerous instances. In the latter case only the principal diagnosis, such as scoliosis, has been recorded in the case of an adolescent who may also have been treated for acne or enuresis.

It is possible to define two broad diagnostic categories—one in which physical conditions are the primary diagnoses (Table I), and a second, which includes a number of emotional, adjustment and academic problems, in which the functional element is paramount (Table II).

Table I.
Primarily Physical Conditions.

Diagnosis.	Number of Patients.		
	Girls.	Boys.	Total.
Seizures	22	52	74
Mental retardation	16	45	61
No abnormality	13	48	61
Growth and development problems	19	33	52
Cardiac conditions	11	29	40
Miscellaneous conditions	9	22	31
Orthopædic problems	5	24	29
Ear, nose, throat and respiratory problems	9	15	24
Skin disorders	11	14	25
Brain damage	0	13	13
Speech disorders	1	8	9
Gynæcological conditions	8	—	8
Total	124	303	427

Table II.
Primarily Functional Conditions.

Diagnosis.	Number of Patients.		
	Girls.	Boys.	Total.
Adjustment reactions of adolescence	22	92	114
Neuroses	25	39	64
Behaviour problems	14	44	58
School problems	3	50	53
Psychoses	3	20	23
Enuresis	2	9	11
Total	69	254	323

It is interesting to note that in the whole series boys outnumber girls nearly three to one; this is specially notable in Table II, where the proportion of boys is even higher. No explanation for this disparity is attempted, but it has been suggested that, in contemporary American culture, boys are more likely to find adolescence difficult.

A recent article gives a comprehensive survey of developments in adolescent medicine (Gallagher *et alii*, 1958), and another (Gallagher, 1958) gives most helpful suggestions for the physician interested in the care of adolescents.

Primarily Physical Conditions.

Primarily physical conditions comprised 56·9% of the total. However, even when there is a distinct physical diagnosis it is still important to pay attention to personality factors and to have the adolescent's confidence. Such concern helped materially towards the effective care of patients with the following conditions.

Seizures.

Seizures were the trouble in 74 cases. These represent 10% of the total number, a much higher incidence than that seen in everyday practice. This was a particularly rewarding and interesting group of patients, and a good measure of success resulted when the outlined principles were followed.

Many of these patients had suffered from major or minor seizures for many years and were seen for continued care. They were usually well controlled, although some required adjustment of medication. Time spent in helping to clarify the patient's ideas about his illness, in reassurance and explanation to parents, and in rehabilitation measures was very well rewarded. Epilepsy still has a very disturbing connotation to the lay person, and most adolescents had many relevant questions when encouraged to ask them.

Patients with seizures or other cerebral disturbances of recent onset were often referred to the clinic for study, probably because many family doctors lacked access to facilities such as the electroencephalograph. An extensive work-up, including electroencephalography, skull films, lumbar puncture and necessary laboratory work, was combined with careful explanation of the illness and treatment measures. The wide variety of medications available offered considerable scope in controlling symptoms (Yahr and Merritt, 1956), and patients were encouraged to take responsibility for their own treatment.

Many patients had classical *grand mal* or *petit mal*, but there were also many whose symptoms were less readily classifiable. Psychomotor seizures, "blackouts", recurrent headaches and abdominal and sensory disturbances were seen. Several patients with temporal lobe epilepsy presented very difficult problems in social, psychological and academic adjustment in addition to their spells (Brown *et alii*, 1956), and one showed great improvement after surgical removal of a focus.

Mental Retardation.

Retarded children (61) formed about 8% of the series, again, perhaps, because family doctors lacked facilities for helping them. As he becomes adolescent, the retarded child faces a host of new problems determined by physical and sexual maturation and the widening gulf that separates him from his peers. A social worker was able to make a material contribution towards the management of exceptional children, by helping parents to understand their needs and encouraging participation in welfare movements.

Special classes for retarded children are commonly available in American school systems, and close liaison with the schools was needed. It was not uncommon, however, for a child presenting a problem of school failure to be found mentally retarded, clinically and on intelligence testing, when his school had not taken much interest in his difficulties. This suggests that an adequate physical examination and individual intelligence testing are mandatory in assessing such a problem.

Placement in State institutions was sometimes used for the protection of the unstable or severely retarded adolescent, as well as to offer him the best opportunities for training. For the borderline defective, however, there were fewer facilities, and these patients presented a challenging problem, since each was potentially a productive citizen; vocational rehabilitation was attempted when possible.

Normal Adolescents.

Normal adolescents (61) include those who came in for routine health check-ups or re-check on past illnesses, or because of some fancy on the part of the parents that the child had an illness, which was not borne out on investigation. Occasionally parents presented a child for study when unable to face a problem of their own, and it was sometimes possible to help the parents towards a more adequate solution.

Growth and Development.

Abnormalities of growth and development accounted for 52 cases.

Obesity was by far the most common problem (35 cases), and obese patients were usually referred "for a check-up on their glands". It was extremely uncommon for any evidence of glandular disturbance to be detected by present methods, although the possibility of a metabolic defect is receiving considerable study (Gallagher *et alii*, 1958). Relative inactivity, emotional difficulties and overeating were all met with, but the subject remains poorly understood. Dietary measures were variably successful, and it seemed that motivation to lose weight was a key factor. Some subjects did well on a combination of "Dexedrine" priming, careful dietary planning and organized exercise, but these were a minority. Interest in the patient and less concentration on his or her figure were often more helpful then specific measures.

Retarded growth and delay in onset of puberty were seen in six cases; these complaints are distressing to the adolescent, to whom conformity with his peers is most important. Again, no evidence of glandular dysfunction was found, and a policy of "wait and see" was employed; the patient was reassured that he would develop as well as his friends, though perhaps more slowly. Those subjects followed for a long period did in fact show gradual and continued normal development.

It was most important to consider all factors influencing stature, and to think in terms of developmental or skeletal age, which gives an accurate idea of the degree of progress towards maturity (Greulich and Pyle, 1950). Hormone therapy was usually avoided, although Bayley *et alii* (1957) suggest that in properly selected cases this can be very beneficial. The Gallaghers (1953) remind us that we should "have constantly in our minds not average data and standards, but instead a clear picture of the wide variations which are still within normal limits".

Gynæcomastia was occasionally a presenting complaint and frequently an incidental finding. Some boys were very disturbed by this manifestation; they were reassured that it was a normal variation and that it would almost certainly disappear within a year or so. No treatment was indicated, and excision was required in only one case, in which considerable mammoplasia persisting at the age of 19 years was a source of much concern. Klinefelter's syndrome needed to be considered in these cases; in none of them, however, were the associated small testes and high level of follicle-stimulating hormone found.

Thyroid disturbances were seen in three cases. Two of the patients were treated cretins requiring continued supervision, and one boy was hyperthyroid and came to surgery after prolonged medical treatment. Hypothyroidism was often suspected by physicians referring obese adolesecents, but this was not borne out by investigations (Gallagher *et alii*, 1958; Heald *et alii*, 1956).

Undescended testis was seen in two post-pubertal boys, and each had an orchidopexy performed. Decisive factors in the management of this condition are discussed by Gallagher *et alii* (1958).

Cardiac Conditions.

Of the 40 patients with cardiac conditions, many were referred because a heart murmur was detected by the family physician or at a school medical examination. Fourteen of these were diagnosed in the clinic as functional systolic murmurs, of no clinical significance, after electrocardiography, chest fluoroscopy and consultation with a cardiologist. Stuckey (1955) has described similar innocent systolic murmurs in childhood. Many murmurs noticed in routine examinations need cause no alarm; unfortunately, it often happens that patient and parents are badly

frightened by the discovery of a murmur, and much unnecessary restriction and unhappiness results.

A variety of significant heart lesions, congenital or acquired, was diagnosed among the other patients, and medical or surgical procedures were carried out as required. When possible, and in most cases, specific restrictions were not placed upon the activity of adolescents with these conditions, since it was thought that the individual's own tolerance to exercise was his best guide.

One boy had a considerable degree of labile hypertension, which was found to be a familial complaint and to be associated with various personality factors. This points up the importance of including the determination of blood pressure in the medical examination of adolescents (Masland *et alii*, 1956*a*).

Miscellaneous Conditions.

"Miscellaneous conditions" (31 cases) include a wide variety of separate diagnoses, which may be grouped under several broad headings.

There were eight patients who required follow-up investigation of chronic conditions, such as Wilson's disease, paraplegia and dermatomyositis.

Nine patients had non-acute conditions requiring surgery, including skin lesions, benign tumours, deformities such as hypospadias and inguinal hernia (several cases). One of the last-mentioned patients afforded a good example of how an adolescent may react to illness, and how he may be helped.

Richard was aged 15 years, and an inguinal herniorraphy had been performed several years previously, with little explanation and considerable pain. Now another hernia had appeared on the opposite side, which obviously needed repair. The boy's evident distress and anxiety when we discussed this seemed disproportionate, and when he was given a chance to talk about his fears, it became evident that he was desperately worried about his sexual functions. He understood next to nothing about these, and he was convinced that masturbation had caused his hernia and done him irreparable harm. Simple explanation and reassurance were effective, and when he was seen in hospital and post-operatively he was relaxed, he had tolerated surgery very well, and he seemed a happier, more mature person.

Acute problems provided five cases; as has been noted, emergencies were not commonly seen, and this accounts for the small number in this group.

The remaining patients presented chronic problems, such as irritable bowel, hirsutism, duodenal ulcer and nervous tic, and three had fæcal impaction with overflow soiling from a grossly distended lower bowel. These presented a difficult problem of diagnosis in disentangling physical and psychic factors.

Orthopædic Problems.

There were 29 patients who presented orthopædic problems. A wide range of disabilities afflicting the growing skeletal system was encountered in these patients; it included postural difficulties, flat feet, slipped femoral epiphysis, Osgood-Schlatter's disease, spondylolisthesis, talipes and chest deformities. It was important to gain the patient's cooperation in carrying out exercises and enduring restrictions such as casts, which present the barrier of nuisance and of "being different" to the confidence-seeking adolescent (Gallagher, 1956).

Ear, Nose, Throat and Respiratory Conditions.

Asthma, hay fever and rhinitis provided most of the 24 cases of ear, nose, throat and respiratory conditions, and skin testing and desensitization were employed in a number of cases. Emotional factors in the production of these conditions were considered, and when possible some amelioration of these was attempted.

Serious deficiencies of hearing were encountered in seven patients, and these were handled in collaboration with the hearing clinic. When a hearing aid was needed, it sometimes required the combined efforts of all concerned to encourage the self-conscious adolescent to wear it.

Skin Disorders.

Twenty-five patients presented skin disorders. Acne was the commonest of these, and a reasonable degree of success was obtained with treatment combining local applications and dietary adjustment with vitamin A given by mouth, hormones and antibiotics in severe cases. There was little to suggest that the adolescent with bad acne had more emotional problems than his fellows, but it seemed evident that increased stress of various kinds could cause exacerbations. Masland *et alii* (1956*a*) remark: "Satisfactory management includes a knowledge of the patient's personality, as well as of the therapy of the disease itself."

Eczema, psoriasis and pruritus were also seen, and treatment was, as usual, variably successful.

Brain Damage.

Thirteen patients had sustained brain damage. These adolescents were basically of normal intelligence, but they showed long-range effects of birth trauma, accidents and intracranial infections. They displayed lacunæ in academic work, together with instability in emotions, behaviour and social adjustment. It was sometimes hard for parents and teachers to realize the nature of this invisible handicap, and much could be done to ease pressures and to capitalize on remaining abilities. In the long run, further research in the prime causes of birth trauma may suggest means of avoiding some of the inadequacies and delinquencies which many of these subjects display as they approach maturity.

Speech Disorders.

One of the nine patients with speech disorders lisped; the others were all stutterers. A distinct association with tension and anxiety was noticed, although all these patients seemed fairly healthy, attractive adolescents. Several received formal speech therapy with benefit; three, at least, made considerable progress on the basis of regular casual visits with the physician, in which general topics and personal problems were discussed.

An association with mixed dominance, specific language disability and consequent academic problems was also noted, which supports the theories of Orton (1937); a plan was being considered for a combined study of language, speech and academic difficulties.

The use of meprobamate for stutterers (Maxwell and Paterson, 1958), in conjunction with speech therapy, merits consideration.

Gynæcological Conditions.

A consultant service for girls with gynæcological problems (eight cases) combined the efforts of gynæcologists, psychiatrists and a social worker, and some very helpful insights into the nature of premenstrual tension and dysmenorrhœa were obtained. Emotional aspects of these complaints reflected the girl's relationships within her family, as well as the degree of her acceptance of a feminine role, and exploration of these, together with appropriate medication, often afforded considerable relief. A thorough physical check-up, including a rectal rather than a vaginal examination, contributed to effective understanding and reassurance of the patient (Heald *et alii*, 1957).

Menorrhagia, amenorrhœa and ovarian agenesis were also seen (Gallagher, 1955*b*).

Susan was aged 14 years, and complained of severe and incapacitating dysmenorrhœa, intractable to medication. Her menarche at 12 had been unexpected and very frightening, and her mother, who also suffered "terrible' cramps with her menstrual periods, had given her no adequate information about sex, feeling that this was shameful. When mother and daughter had each been able to allay her fears and to receive proper information from the doctor, Susan's symptoms proved much more amenable to medication, and she no longer had to miss school with each menstrual period.

Primarily Functional Conditions.

Patients with primarily functional conditions comprised 43·1% of the total. It is recognized that the adolescent faces a number of tasks, whose resolution depends to a large extent upon successful progress in his earlier personality development. Gardner (1958) suggests that these include the modification of his concepts of his parents, the assumption of appropriate moral standards and self-control, identification with a mature sexual role, and educational and vocational choice. Many authors have written perceptively about the adolescent's response to these tasks (Erikson, 1950; Frank, 1956; Gallagher, 1951; Plant, 1950; Mohr and Despres, 1958). The last-mentioned state the position as follows:

> Without development of a defined neurosis, many people still betray a bewildering variety of ineptitudes and inability to meet normal human situations. Inhibition, rigidity, compulsiveness, and similar traits characterise them in varying degree .... Such a person is not necessarily mentally or emotionally ill, but nevertheless is impeded in his development and in full utilization of his capacities. Disturbance of this order is common in adolescence . . . [when] weaknesses as well as strengths become more apparent.

Although some of the adolescents seen did have definable neuroses or psychoses, the great majority in this group did not fit readily into such a classification. The diagnostic category "adjustment reaction of adolescence" includes these patients, who display less severe departures from the normal than those in other groups.

Adjustment Reactions of Adolescence.

Of the total series, 15·2% is found in this, the largest single group of patients (114 cases). A reasonable resolution of the problem proved possible in most cases, which suggests that the opportunity for discussion with an objective arbiter met a need for many families. It is interesting to note the relatively small number of girls in this group.

Various aches and pains, and minor disturbances of behaviour at home, at school or in the community, figured prominently, and a chance to ventilate some of the mixed feelings and hostilities behind these was often sufficient to help the adolescent handle his affairs more realistically. It was also important to attempt an explanation of the situation to parents and teachers.

Charles, aged 14 years, was a chubby, immature only child, whose complaints were poor school performance and very frequent violent headaches, present for several years. No organic disorder or lack of intelligence was found; but at the first interview he spontaneously displayed violent hostility towards his grossly over-protective parents and a woman teacher who contributed to this over-concern. He repeated this performance through several visits, and pressure was relaxed at home and at school at the doctor's suggestion. This general loosening of the situation brought about a complete remission of his headaches after the first visit, and his school work showed moderate improvement. These changes were maintained over a two-year period without relapse.

Reflection of parental problems, response to the loss or inattention of a parent, or inability of parents to "reach" the adolescent accounted for many of these problems, and the physician may sometimes act as a substitute parent for some of these patients.

Joseph, aged 12 years, was an unattractive, unhappy, suspicious boy, who came in because of "nervousness" and withdrawal in school. His father had deserted the family, his mother had remarried and the stepfather was not interested in the boy. He rapidly formed a close attachment for his doctor, came frequently to see him and liked to display his artistic and musical ability. Improvement in his schoolwork and social adjustment was "spectacular", in the words of his teacher, and he became a leading member of his class.

Many adolescents were quite ignorant about sex, others had a variety of distorted ideas, and some were avowedly confused and disturbed about it. Masturbation, homosexual experiences, premature heterosexual experiments and other tentative expressions were commonly encountered as "normal variations" in the attempt to communicate on a mature sexual level (Plant, 1950). The majority of adolescents valued the opportunity to receive information and to discuss these matters openly and without embarrassment.

Problems in the field of vocation, and the "identity crisis" of Erikson (1950), were often seen in the older adolescents, and the chance to talk out these confusions with the physician proved helpful.

Stanley was a diffident college freshman, aged 19 years. He was confused about his future, his family relationships, his social adjustment and his vocational choice, he was failing in college and unable to concentrate. He formed a warm and friendly relationship with the physician, and he was able to discuss these problems sensibly. His all-round adjustment improved considerably, and he was able to make realistic plans for his future.

These patients demonstrated the value of an informal, common-sense approach informed with understanding of the adolescent's needs, and all but a few responded to this expression of interest by an older person outside the family. When this was less successful, it was usually because the doctor attempted to probe too soon or too deeply, or because the relationship proved threatening to the frightened adolescent. The doctor does well to avoid leading questions or advice; he should listen and not interpret, and above all he should be honest and straightforward, not patronizing or authoritarian (Gallagher, 1958).

Neuroses.

Many adolescents display, in a transitory phase, symptoms upon which a neurosis or a psychosis may be diagnosed; but these may be fluctuating and readily reversible In general, those (64) in whom neuroses were finally diagnosed were more ill than most of the adolescents seen. Considerable use was made of psychological testing and personality evaluation by clinical psychologists, and of consultation with supervising psychiatrists, disposition depending upon a consensus of opinion. Several of these patients were followed in regular visits, for the purpose of learning and experience in the psychodynamics of these conditions.

Distinct diagnoses included anxiety states, hysterical conversion symptoms, obsessive-compulsive conditions, homosexual panic states, depression and phobic illnesses. Severe psychosomatic disorders such as asthma, headache, blackouts and ulcerative colitis were encountered, and two patients had attempted suicide. Some were best described as perpetually "on the run", often literally, as an expression of their inadequacy to deal with problems.

An interesting group of 18 patients displayed separation anxiety to the point of refusal to go to school. This has been called "school phobia", and patients were usually characterized by above normal intelligence, undue sensitivity, passiveness, and a strong and conflict-ridden bond with the parent of the opposite sex; they also displayed a wide and bizarre variety of somatic symptoms.

When severe neuroses were diagnosed, it was made clear to the parents that the patients required psychiatric help. It was often difficult to find this, however, because of the overcrowded waiting lists for treatment at psychiatric facilities.

Behaviour Problems.

In general, the 58 patients with behaviour problems were distinguished from those with adjustment reactions by the severity of their symptoms. Various kinds of delinquency, severe antisocial and aggressive behaviour, chronic truancy and general inaccessibility were characteristic of the patients in this group; these symptoms were found to stem from a variety of characterological deficiencies of a fairly primitive type. Although these adolescents often made a ready and apparently warm relationship, this was usually superficial and inadequate for therapeutic purposes, and they were also referred, when possible, for expert psychotherapy. Some found their way into mental hospitals or reform schools.

School Problems.

School is often the battleground upon which are fought out the adolescent's conflicts with himself, his family and his environment, and commonly enough the teacher and authority in general bear the brunt of his hostility (Liss, 1955). In recent years, studies of physical and emotional factors in learning (Gallagher, 1957; Kimball, 1953) have clarified some of the problems which are presented in this field, and Darling (1954) makes a plea for more active cooperation between doctors and the teaching profession.

A careful physical examination, with particular attention to general fitness, eyesight, hearing and neurological competence, was carried out on all the 53 adolescents who complained of poor school achievement, together with individual assessment of intelligence and basic skills in reading, spelling and arithmetic. An entity in which reversals of letters and words, poor grasp of phonetics, clumsy handwriting and sometimes mixed dominance were found, in an hereditary pattern, presented a gross learning handicap. Gallagher (1950, 1958) points out that behaviour problems, lack of interest and anxiety symptoms may develop out of the frustration and discouragement that this handicap can produce in an intelligent child.

Emotional factors needed consideration, and adverse reactions to parental pressure, rejection of a mature role, attention-getting manœuvres and expressions of rivalry were sometimes seen. Relatively few girls presented school problems.

A careful investigation usually displayed causes for academic failure, and where possible attempts were made to deal with these. Lowering of expectations, change of schools or courses, remedial teaching, counselling and, occasionally, psychotherapy were employed. These measures met with some success, but it was generally agreed that these are complex problems, particularly when they are of long duration. A less severe variety was that seen as a physiological-psychological slump in the mid-teen years; this was usually transient, and probably represented a response to the many rapid changes taking place in mind, body and personality.

Psychoses.

Frankly psychotic adolescents (23) fell into two groups, those who had a lifelong history of inadequacy and bizarre behaviour, and those who presented acute symptoms. In either case, there was usually evidence of early and continued severe distortion in the family structure. Schizophrenia was the commonest diagnosis (eight cases); one boy displayed a distinct manic-depressive illness, and the remainder presented varying degrees of inadequacy, withdrawal and disturbed behaviour. A borderline psychotic state was not uncommon. The patient was usually referred to a psychiatrist or, if necessary, admitted to hospital, but some managed to maintain a marginal adjustment and even made improvement in the course of maturation.

Enuresis.

Enuresis was still a problem with some adolescents, and in addition to those for whom enuresis was the primary diagnosis (11), numerous others displayed it as one manifestation of a more general inadequacy or an adjustment reaction. Physical studies disclosed no anomalies, and patients tended to be immature, inhibited, deprived or passive individuals. Treatment met with varying degrees of success. It seemed probable that the amount of interest shown by the physician was one curative factor, and some patients, particularly younger adolescents, responded at once to this interest. "Dexedrine" and other drugs were helpful, and some patients were being tried with a mechanical device. With these, the question of motivation was fundamental.

Comment.

The establishment and growth of the Adolescent Unit in Boston, with the development of similar clinics elsewhere in the United States (Roth *et alii*, 1956), and vast improvements in school and college health services (Farnsworth and Thorndike, 1956; Jacobinzer, 1957), bear out an editorial comment in *The New England Journal of Medicine* (1953):

> A neglected field of medicine has been that of adolescence; the explanation is simple. Until recently, the pædiatrician has been preoccupied with premature babies, transfusions, feeding problems, running ears .... The internist has also been busy with the ills of adulthood and advancing age and has still to come to the period of adolescence. Yet the field is particularly important, marking as it does the transition from boy to man and from girl to woman.

Similar editorial remarks appeared at about the same time in the *British Medical Journal* (1954):

> The problems of youth are many-sided and compelling. To their solution, medicine has a contribution to make; this is surely above all in the sphere of the family doctor.

These ideas are particularly significant in the fields of preventive medicine and mental health, and now that many more pressing therapeutic problems have been solved, the profession needs to develop in this direction. Gallagher (1955*a*) has commented as follows:

> We all need to know more about adolescents. They are, after all, the adults of tomorrow, the inheritors of our civilization. Those who are now handicapped, or whose personalities and future effectiveness and happiness are threatened, have still the hope of change for the better. Later, and soon, that malleability, that capacity for change will be largely lost. Adolescence is the latest of the age periods in which we can expect success from other than the most expert and the most prolonged efforts to strengthen personalities or to build emotional or physical health.

The Adolescent Unit does not seek to establish another medical specialty; it is a general practice clinic, distinguished only in that it cares for a specific age group, and one of its chief aims is to train doctors in the care of people, not only of their symptoms. It emphasizes the warm relationship between the doctor and his patient and a thorough appraisal of each person and his environment, informed with understanding of personality development and emotional causes of ill-health. These principles may certainly be applied in general and consultant practice, or in school and college health services, as well as in an out-patient clinic (Balint, 1957; Bibring, 1956; Buttsworth and White, 1957; Harris and Heald, 1957; Harris and Peters, 1954; Jansen, 1954; Robinson, 1958; Watts, 1958).

We may agree with Mohr and Despres (1958) that "the adolescent is not a conundrum. In his development he follows understandable biological laws determining growth and maturation. His developmental history can be read in the history of his parents, his family, his community". Adolescents, however, display many distinctive physical and emotional disturbances, and physicians need a clearer understanding of the factors producing them, that they may assist young people towards healthy and productive maturity. The work of the Adolescent Unit may therefore be seen as a venture in preventive medicine, as well as a programme for physical and mental health (Editorial, 1958).

Summary.

A general medical clinic for adolescents is described, with comments on recent progress in this field. A series of clinic patients is discussed, to show the relative frequency of various diagnoses and the means of treatment adopted. It is suggested that complete medical care includes consideration of emotional and environmental factors, and that general physicians should be trained to deal adequately with these elements.

Acknowledgements.

I wish to acknowledge with gratitude the teaching and generous interest of Dr. J. Roswell Gallagher, chief of the Adolescent Unit and lecturer on pædiatrics, Harvard Medical School. Many other members of the Adolescent Unit staff contributed to the experience summarized in this paper, and the Grant Foundation, Incorporated, provided necessary funds.

REFERENCES.

ARING, C. D. (1958), "Sympathy and Empathy", *J. Amer. med. Ass.*, 167: 448.

BALINT, M. (1957), "Psychotherapy and the General Practitioner", *Brit. med. J.*, 1: 156.

BALINT, M. (1957), "The Doctor, His Patient, and the Illness", Pitman Medical, London.

BAYLEY, N., GORDON, G. S., and LISSER, H. (1957), "Long-Term Experiences with Methyltestosterene as Growth Stimulant in Short, Immature Boys", *Pediat. Clin. N. Amer.*, November: 819.

BIBRING, G. L. (1956), "Psychiatry and Medical Practice in General Hospital", *New Engl. J. Med.*, 254: 366.

BROWN, I. A., FRENCH, L. A., OGLE, W. S., and JAHNSON, S. (1956), "Temporal Lobe Epilepsy; Its Clinical Manifestation and Surgical Treatment", *Medicine*, 35: 425.

BUTTSWORTH, B. R., and WHITE, J. R. E. (1957), "The Maladjusted Patient in General Practice", MED. J. AUST., 2: 788.

DARLING, J. R. (1954), "The Borderline between Medical, Psychological and Educational Fields", MED. J. AUST., 1: 496.

EDITORIAL (1954), "Adolescence", *Brit. med. J.*, 1: 748.

EDITORIAL (1953), "Appraisal of Adolescent", *New Engl. J. Med.*, 248: 437.

EDITORIAL (1958), "Teen-age Clinics", *J. Amer. med. Ass.*, 168: 288.

ERIKSON, E. H. (1950), "Childhood and Society", Norton, New York.

FARNSWORTH, D. L., and THORNDIKE, A. (1956), "Health in Colleges and Universities", *New Engl. J. Med.*, 255: 949, 992.

FRANK, M., and FRANK, L. K. (1956), "Your Adolescent at Home and in School", Viking, New York.

GALLAGHER, J. R. (1950), "Specific Language Disability: A Cause of Scholastic Failure", *New Engl. J. Med.*, 242: 436.

GALLAGHER, J. R. (1951), "Understanding Your Son's Adolescence", Little, Brown, Boston.

GALLAGHER, J. R., and GALLAGHER, C. D. (1953), "Some Comments on Growth and Development in Adolescents", *Yale J. Biol. Med.*, 25: 334.

GALLAGHER, J. R. (1955*a*), "The Adolescent's Personality: Implications for Treatment", *R. I. med. J.*, 38: 491.

GALLAGHER, J. R. (1955*b*), "Dysmenorrhea and Menorrhagia in Adolescence", *Conn. St. med. J.*, 19: 469.

GALLAGHER, J. R. (1956), "Rest and Restriction: Their Conflict with an Adolescent's Development", *Amer. J. publ. Hlth*, 46: 1424.

GALLAGHER, J. R. (Chairman) (1957), "Health Service Programs for Secondary Schools", *Bull. nat. Ass. Secondary School Principals*, 41: 92.

GALLAGHER, J. R. (1958), "Problems of the Adolescent", *Pediat. Clin. N. Amer.*, August: 775.

GALLAGHER, J. R., HEALD, F. P., and MASLAND, R. P. (1958), "Recent Contributions to Adolescent Medicine", *New Engl. J. Med.*, 259: 24, 74, 123.

GARDNER, G. E. (1958), "The Behavioural Disabilities in Adolescence", to be published.

GREULICH, W. W., and PYLE, S. I. (1950), "Radiographic Atlas of Skeletal Development of the Hand and Wrist", Stanford Univ. Press.

HARRIS, H. I., and HEALD, F. P. (1957), "Psychotherapy of Adolescents by Pediatrician and Psychiatrist", edited by Balser, B. H., International Univ. Press, New York: 113.

HARRIS, H. I., and PETERS, C. M. (1954), "The Treatment of Psychosomatic Disorders by the Internist", *Amer. Practit. (Philad.)*, 5: 158.

HARVARD MEDICAL SCHOOL (1957), "Courses for Graduates: Announcement for 1957-58", Harvard Medical School, Boston.

HEALD, F. P., MASLAND, R. P., RENOLD, A. E., and GALLAGHER, J. R. (1956), "Hypothyroidism in the Adolescent", *J. Amer. med. Ass.*, 162: 161.

HEALD, F. P., MASLAND, R. P., STURGIS, S. H., and GALLAGHER, J. R. (1957), "Dysmenorrhea in Adolescence", *Pediatrics*, 20: 121.

JACOBINZER, H. (1957), "Health Services for the School Age Child: A New Approach", *J. Amer. med. Ass.*, 165: 1669.

JANSEN, M. G. (1954), "An Approach to Neuroses in General Practice", MED. J. AUST., 2: 422.

KIMBALL, B. (1953), "Case Studies in Educational Failure during Adolescence", *Amer. J. Orthopsychiat.*, 23: 406.

LISS, E. (1955), "Motivations in Learning", *Psychoanal. Study Child*, 10: 100.

MASLAND, R. P., HEALD, F. P., GOODALE, W. T., and GALLAGHER, J. R. (1956*a*), "Hypertensive Vascular Disease in Adolescence", *New Engl. J. Med.*, 255: 894.

MASLAND, R. P., HEALD, F. P., HILL, W. R., and GALLAGHER, J. R. (1956*b*), "Some Comments on Acne Vulgaris in Adolescents", *J. Pediat.*, 49: 680.

MAXWELL, R. D. H., and PATERSON, J. W. (1958), "Meprobamate in the Treatment of Stuttering", *Brit. med. J.*, 1: 873.

MOHR, G. J., and DESPRES, M. A. (1958), "The Stormy Decade: Adolescence", Random House, New York.

ORTON, S. T. (1937), "Reading, Writing and Speech Problems in Children", Norton, New York.

PLANT, J. S. (1950), "The Envelope: A Study of the Impact of the World upon the Child", Commonwealth Fund, New York.

ROBINSON, B. (1958), "Psychosomatic Disorders: Their Treatment by the Physician", MED. J. AUST., 1: 415.

ROTH, A., WEISSMAN, A., and LINDEN, C. (1956), "A Plan for Medical Care for Adolescents", *Pediatrics*, 18: 86.

YAHR, M. D., and MERRITT, H. H. (1956), "Current Status of the Drug Therapy of Epileptic Seizures", *J. Amer. med. Ass.*, 161: 333.

STUCKSEY, D. (1955), "Innocent Systolic Murmurs in Childhood", MED. J. AUST., 2: 841.

WATTS, C. A. H. (Chairman) (1958), "Psychological Medicine in General Practice", a report prepared by a working party of the Council of the College of General Practitioners, *Brit. med. J.*, 2: 585.

SCALENE NODE BIOPSY.

By D. C. PERRY, F.R.A.C.S.,

Thoracic Surgical Research Fellow, The Royal North Shore Hospital of Sydney.

BIOPSY of abnormal tissue is often necessary for the efficient management of patients with pulmonary disease. Its use avoids the uncertainty and expense of diagnosis by exclusion and the possibly fatal delay entailed in diagnosis by protracted observation.

The tissue necessary for biopsy may be obtained by bronchoscopy, by needle biopsy of pleura or lung, by excision of enlarged cervical lymph nodes, or by thoracotomy. A simpler method than thoracotomy is clearly preferable, especially if the lesion cannot be dealt with by complete excision at the time. Daniels (1949) showed that the lymph nodes lying behind the clavicle, although impalpable, may reflect pathological changes in the lungs or mediastinum, and that examination of them may allow histological diagnosis to be made. As these nodes lie in close relation to the scalenus anterior muscle, examination of them is termed "scalene node biopsy".

Although not all authors do so, it is convenient to distinguish those cases in which the nodes can be felt clinically from those in which the nodes are impalpable. In the former, biopsy will provide a diagnosis in nearly every case, in the latter in only a certain number. In this communication, scalene node biopsy refers only to those cases in which the nodes are impalpable; supraclavicular node biopsy refers to both palpable and impalpable cases.

The Lymphatics of the Lung and Root of the Neck.

The anatomy of the lymphatic drainage of the lungs and mediastinum has been studied by the classical methods of injection and summarized by Rouviere (1932). The following account is based on this work.

The Scalene Nodes.

The scalene nodes comprise the transverse cervical chain and the lowermost nodes of the internal jugular chain. The transverse cervical chain comprises one to ten nodes; it is continuous laterally with the nodes surrounding the accessory nerve and medially with the lower deep cervical chain. The nodes are disposed in the front of the transverse cervical vessels and the anterior scalene muscle (Figures I and II).

Lymphatic Drainage of the Lungs.

The lymphatic drainage of the right lung passes either directly or through interlobar lymph nodes to the right paratracheal chain, to the right anterior mediastinal chain or to the subcarinal group. From the latter it passes to the right paratracheal chain. The paratracheal and anterior mediastinal chains terminate in the para-

tracheal and anterior mediastinal trunks, the termination of which will be described later (Figure III).

The lymphatic drainage of the left lung is more complex. From the upper part of the upper lobe and from the upper part of the lower lobe it passes to the node of the ductus arteriosus or to the left anterior or to the left paratracheal chain. The lower part of the lower lobe drains to the subcarinal group and thence to the right paratracheal chain. From the middle region of the lower lobe and from the lower part of the upper lobe, the lymphatic drainage is partly to the left paratracheal group and partly to the subcarinal nodes, thence to the right side of the mediastinum. Confirmation of the fact that a great part of the lymphatic drainage of the left lung passes to the right side of the mediastinum

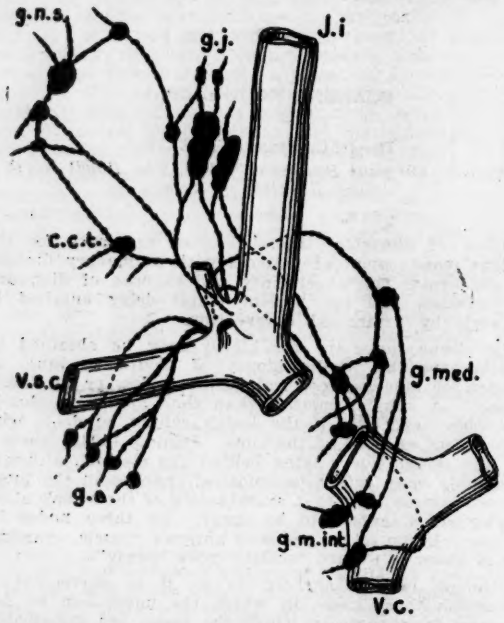

Figure I.

Diagram of the lymph nodes of the root of the neck (right side): g.j., nodes of inferior portion of the deep cervical chain; c.c.t., nodes of the transverse cervical chain; g.a., axillary nodes; g.n.s., nodes of the accessory nerve; g.med., glands of superior mediastinum; g.m.int., internal mammary nodes. (Reproduced from *Ann. anat. path.* by permission of the publishers.)

and to the collectors on the right side of the neck is afforded by the studies of Warren and Drinker (1942), who, by instilling the dye T1824 into various segments of the dog's left lung, obtained the dye from the right lymphatic duct (Figure IV).

The Terminal Collectors of Lymph from Structures above the Diaphragm.

The various lymphatic systems of the head and neck, fore-limb and thorax drain into the subclavian, jugular, transverse cervical, axillary, recurrent, internal mammary, anterior mediastinal and paratracheal trunks. The mode of termination of these trunks differs on the two sides of the body.

On the right side the commonest arrangement is as illustrated in Figure I; a great lymphatic trunk is formed by the union of the transverse cervical, internal jugular, subclavian and internal mammary trunks. The reminder join the internal jugular vein or subclavian vein separately. This arrangement was found in eight out of ten cases (Rodrigues and Pereira, 1930).

On the left side the anterior mediastinal and the paratracheal trunks join the thoracic duct and the remainder join the internal jugular vein or subclavian vein separately (Figure II).

Technique of Excision of Scalene Nodes.

The operation is performed under local anæsthesia and may be preceded by bronchoscopy if desired. It is preferable to have the patient tilted feet downwards 10° to 15°, particularly if caval obstruction is present. In the present series the right scalene nodes have been examined in lesions of the right lung or the left lower lobe. Left scalene nodes have been removed where the disease is confined to the left upper lobe. It is theoretically desirable in lesions adjoining the left main fissure to perform the biopsy on both sides (Connar, 1955). However, since the procedure is somewhat tedious if a mediastinal exploration is performed, and since there is a risk of pneumothorax in the mediastinal exploration, in nearly all cases in this series the dissection has been done on one side only.

A skin crease incision is made over the lower part of the sternomastoid muscle, the heads of which are separated. The fascia of the omo-hyoid is detached from the inferior border of the muscle and the omo-hyoid is

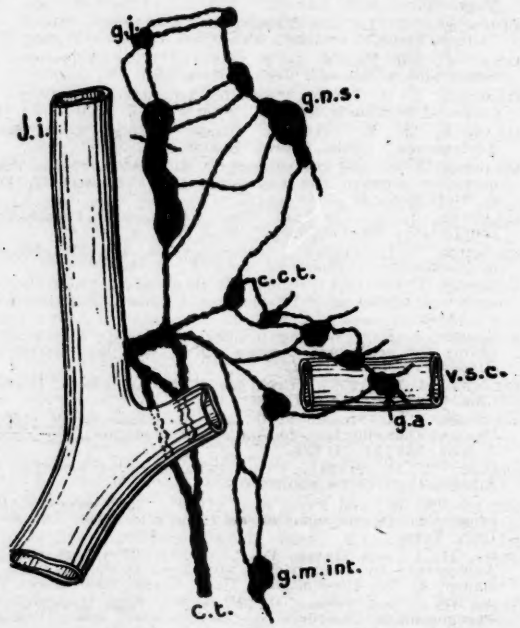

Figure II.

Diagram of the lymph nodes of the root of the neck (left side): g.j., nodes of inferior portion of the deep cervical chain; c.c.t., nodes of the transverse cervical chain; g.a., axillary nodes; g.n.s., nodes of the accessory nerve; g.m.int., internal mammary nodes. (Reproduced from *Ann. anat. path.* by permission of the publishers.)

drawn upwards displaying the internal jugular vein, the subclavian vein and a pad of fat lying in front of the anterior scalene muscle. The pad of fat is divided in the line of the omo-hyoid muscle and a finger is passed down behind it to free it from the prevertebral fascia. The dissection is carried medially behind the internal jugular vein and laterally to the edge of the anterior scalene muscle. As the dissection proceeds more tissue can be drawn up from behind the subclavian vein. The transverse cervical vessels are found on the back of the pad of fat and are usually better divided because they send small branches to the pad of fat, which may be torn, and because the nodes, if abnormal, are often adherent to the vessels. The pad of fat removed is then examined if possible by a frozen section.

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If this is normal or if the naked eye appearance of the nodes suggests that they are normal, the superior mediastinum should next be explored, as described by Harken, Black, Clauss and Farrand (1954). The anterior and medial aspect of the internal jugular is exposed and the dissection is carried along the wall of the internal jugular and the innominate vein. The trachea can be felt medially. As the dissection proceeds, a flat malleable retractor and a headlight are used and the dissection is continued by gentle use of the fingertip or a blunt dissector. On the right side the innominate vein may be traced to the junction of the azygos, and on the left side the dissection is carried to the level of the arch of the aorta. If indurated nodes are felt, they may be enucleated with the finger, or they may be exposed and a snippet maybe taken with appropriate forceps. The mediastinal dissection must be gentle and painstaking.

Although Connar (1955) usually found eight to ten nodes in the tissue removed, in this series two to four was the usual number.

If no nodes are visible in the tissue removed, it should be cleared with a fat solvent. Tiny nodes are thus made obvious. If none are seen, the resultant tissues should be embedded and cut, although it is unlikely that any abnormal tissue will be found.

Results.

The results of supraclavicular node biopsy in this unit in 1956-1957 are summarized in Table I.

Mediastinal exploration was carried out in six cases of bronchial carcinoma, and furnished a diagnosis in three (Table II). It was also done unsuccessfully in the case of lymphoma.

It will be seen that (i) tumours of the right and left lungs involve the scalene nodes with approximately equal frequency; (ii) lesions of the lower lobes rarely metastasize to the scalene nodes; (iii) lesions of the left upper lobe metastasize to the scalene nodes of the left side, and lesions of the left lower lobe to those of the right.

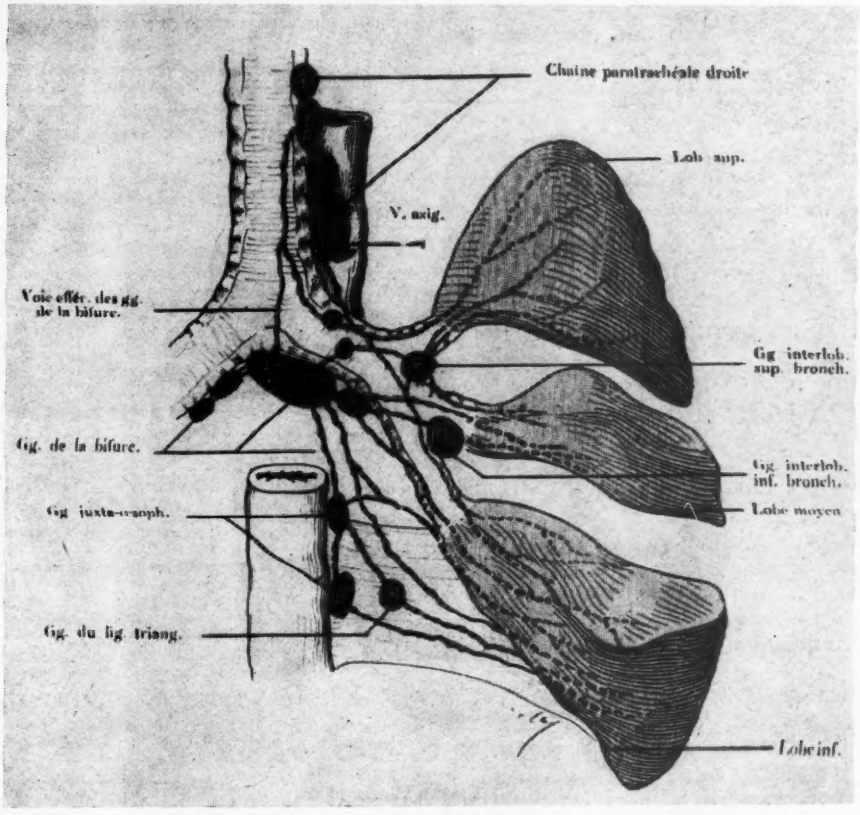

FIGURE III.

Lymphatic drainage (right lung): *Gg. de la bifurc.*, subcarinal nodes; *Chaine paratrachéale droite*, right paratracheal chain. (Reproduced from "*L'anatomie des lymphatiques de l'homme*", by H. Rouviere, by permission of the publishers.)

In the entire series of 54 cases the thoracic duct was injured once. It was ligated without ill effect. The right subclavian vein was injured once, but hæmorrhage was controlled by packing with gelatin sponge. Four hæmatomata occurred, but required no treatment.

Discussion.

Scalene node biopsy provided histological confirmation of diagnosis in roughly one-third of all cases to which it was applied. It has been of most use in bronchial carcinoma and sarcoidosis. Other conditions which have been diagnosed by this means include tuberculosis, silicosis (Daniels) and histoplasmosis (Johnson and MacCurdy, 1952).

Of the ten patients with bronchial carcinoma with impalpable nodes, five cases were unsuitable for thoracotomy for various reasons (spread to contralateral lung, widened mediastinum, respiratory insufficiency), and scalene node biopsy allowed rapid diagnosis and early

discharge. The remaining five patients were spared a useless thoracotomy, and were treated with radiotherapy. Daniels has performed scalene node biopsy after exploring an inoperable carcinoma, and found metastasis present.

In three cases invaded nodes were found only after exploration of the mediastinum. This is similar to the experience of Harken, Black, Clauss and Farrand (1954), who, in a much larger series, found that mediastinal exploration nearly doubled the number of cases in which metastases were found.

Harken, Black, Clauss and Farrand also advocate that scalene node biopsy should be performed in all cases before thoracotomoy, and that scalene node metastasis is a sign of inoperability. It may, however, be argued that an attempt should be made to remove the primary tumour (*Lancet* editorial, 1953).

Changes were present in nearly all cases of sarcoidosis. These changes do not, however, allow a diagnosis to be made without other evidence, as similar changes may occur in tuberculosis and more rarely in other granulo-

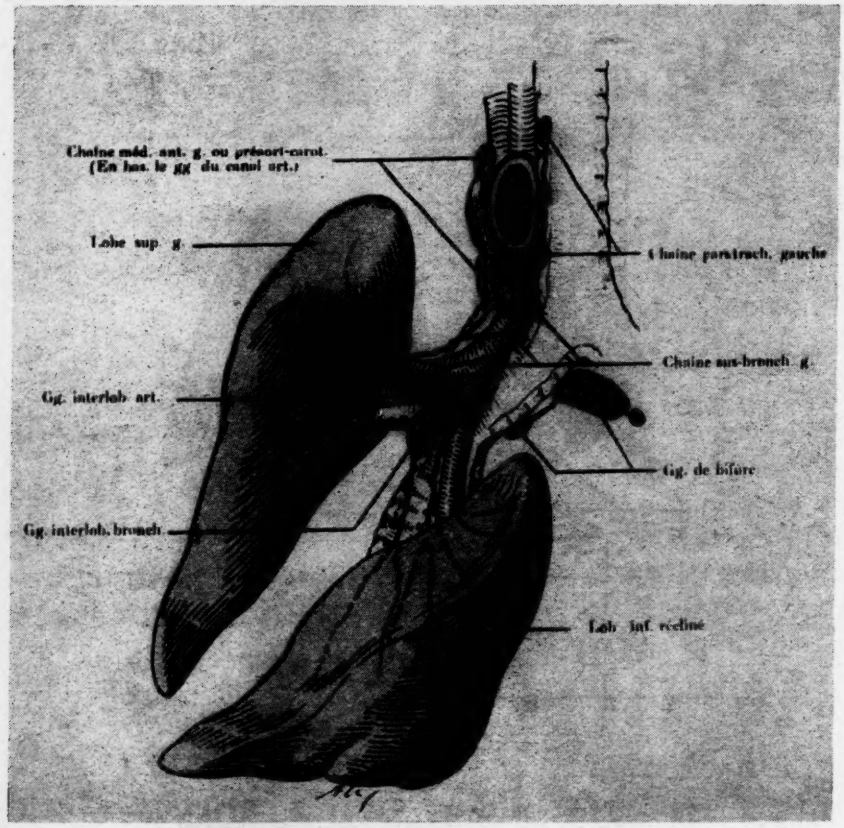

FIGURE IV.

Lymphatic drainage (left lung): *Chaine paratrach. gauche*, left paratracheal chain; *Chaine méd. ant. g. ou préaort-carot.*, left anterior mediastinal chain; *Gg. de bifurc.*, subcarinal nodes. (Reproduced from *"L'anatomie des lymphatiques de l'homme"*, by H. Rouviere, by permission of the publishers.)

TABLE I.

Supraclavicular Node Biopsies, 1956–1957.

Final Clinical Diagnosis.	Nodes Palpable.		Nodes Impalpable.	
	Positive.	Negative.	Positive.	Negative.
Primary bronchial carcinoma	20	0	10	21
Sarcoidosis	2	0	7	1
Lymphoma	4	1	0	1
Secondary carcinoma ..	3	0	2	2
Tuberculosis	2	0	0	1
Other	0	0	0	9
Total	31	1	19	35

TABLE II.

Incidence of Supraclavicular Node Metastasis in Bronchial Carcinoma.

Site of Primary Tumour.	Nodes Palpable.		Nodes Impalpable.	
	Right.	Left.	Right.	Left.
Right lung:				
Confined to upper lobe	6	0	2	0
Confined to middle or lower lobes	0	0	1	0
Others (including effusions)	5	0	1	0
Left lung:				
Confined to upper lobe	0	2	0	3
Confined to lower lobe ..	1	0	1	0
Others (including effusions)	5	1	1	1

matous conditions and even in carcinoma (ten Seldam, 1956).

Finally, the safety of the procedure should be pointed out. In this series there was no significant morbidity. Harken, Black, Clauss and Farrand encountered two cases of pneumothorax and two of injury to the great veins, which was controlled by pressure. Other recorded complications include chylous fistula, which closed spontaneously after ten days. There is no recorded mortality.

Summary.

1. The anatomy of the lymphatics of the lungs and of the root of the neck is reviewed, and the technique of excision of the scalene nodes is described.

2. Diagnosis was possible by this means in ten cases out of 31 of bronchial carcinoma. Lesions involving the upper lobe are most likely to involve these nodes.

3. Changes of sarcoidosis were present in seven cases out of eight, though here the appearances are not pathognomonic.

4. The operation is without mortality or significant morbidity.

Acknowledgements.

My thanks are due to the General Medical Superintendent and to the staff of the Thoracic Unit, The Royal North Shore Hospital of Sydney, for permission to use material in the case records of the hospital.

References.

CONNAR, R. G. (1955), "Prescalene and Deep Cervical Node Biopsy", *Surg. Gynec. Obstet.*, 101: 733.

DANIELS, A. C. (1949), "A Method of Biopsy Useful in Diagnosing Certain Intrathoracic Diseases", *Dis. Chest*, 16: 360.

EDITORIAL (1953), "Scalene Node Biopsy", *Lancet*, 2: 1346.

HARKEN, D. E., BLACK, H. CLAUSS, R., and FARRAND, R. E. (1954), "A Simple Cervico-Mediastinal Exploration for Tissue Diagnosis of Intra-Thoracic Disease", *New Engl. J. Med.*, 251: 1041.

JOHNSON, J. E., and MACCURDY, J. M. (1952), "Pulmonary Histoplasmosis Diagnosed by Scalene Node Biopsy", *Amer. Rev. Tubere.*, 66: 497.

RODRIGUES, A., and PEREIRA, S. (1930), "*Sur les gros troncs lymphatiques de la base du cou*", *Ann. anat. path.*, 7: 1019.

ROUVIERE, H. (1932), "*L'anatomie des lymphatiques de l'homme*", Masson et Cie, Paris.

TEN SELDAM, R. E. J. (1956), "Sarcoid-Like Lesions in Lymph Nodes Draining Carcinoma", MED. J. AUST., 1: 916.

WARREN, M. F., and DRINKER, C. K. (1942), "The Flow of Lymph from the Lungs of the Dog", *Amer. J. Physiol.*, 136: 207.

TOTAL ANOMALOUS PULMONARY VENOUS CONNEXION.

By M. J. EADIE, J. H. HOOD, L. F. MASEL,

AND

M. E. B. MURPHY,

Brisbane General Hospital.

ONE of the less common varities of congenital heart disease is connexion of some or all of the pulmonary veins to the right side of the heart or systemic veins. As it is customary, at the present time, to consider this malformation from the structural aspect rather than from the functional, the term "connexion" is preferable to the more commonly used "drainage" (Edwards, 1953).

In 1942 Brody could find record of 37 cases of total anomalous connexion and 65 of partial anomalous connexion. Healy (1952) found 61 total cases, and 80 partial. We have been able to find mention of 192 cases of total anomalous pulmonary venous connexion in the English literature, including one previous Australian case (Graham, 1944), and we wish to add a further four cases which we have seen in the past year, and to review briefly the literature, which has not been done since 1954 (Keith *et alii*), when there were 54 cases available, though Darling *et alii* considered some aspects of the 80 cases available in 1957. The figure of 192 does not include a number of cases the existence of which is indicated, but of which no details are given, and it does not include a few cases in which the anomalous venous connexion was not the major part of the anomaly.

Report of Cases.

CASE I.—A female, aged five and a half months, presented at the Hospital for Sick Children with a history of chronic cough and failure to thrive and the symptoms of a recent upper respiratory tract infection. The child was undersized, with slight cyanosis of the lips. There were signs of consolidation in the left upper lobe; the heart was enlarged and there were no murmurs. Pulmonary infection was considered probable and chemotherapy begun.

Over the next few days it became apparent that the child had passed into cardiac failure, and digitalis and mercurial diuretics were instituted. The cardiac findings had changed somewhat: the pulse rate was 150 per minute, respiratory rate, 100 per minute, and blood pressure, 100/60 mm. of mercury; there was slight central cyanosis; the liver was

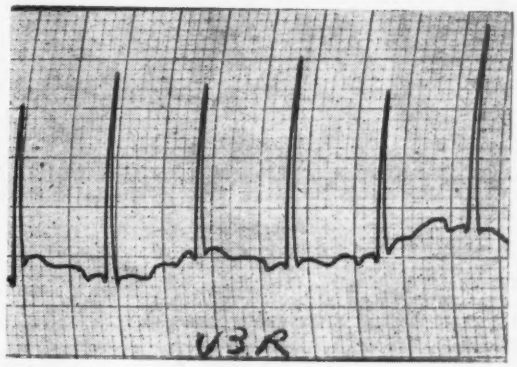

FIGURE I.
Lead V3R in Case I.

palpable one inch below the rib margin; the neck veins were not distended and there was no obvious peripheral œdema; the apex beat was a diffuse systolic heave outside the midclavicular line, and there was a systolic impulse over the right ventricle. A moderately loud systolic murmur, rough in character and fairly long in duration, was present over the præcordium, its site of maximum intensity varying from time to time between the apex and the base of the heart. A presystolic gallop was present over the right side of the heart, and the second heart sound in the pulmonary area was minimally split, with accentuation of the pulmonary element. The electrocardiogram showed evidence of right ventricular and right atrial hypertrophy (Figure I). X-ray examination of the chest showed an enlarged heart and broadened superior mediastinum. At fluoroscopy the mediastinal cardiovascular appearance was said to be identical with that of connexion of pulmonary veins to a left superior vena cava (Figure II).

The cardiac failure proved refractory, and pulmonary infection progressed, the child dying at the age of six and a half months.

The essential autopsy findings were as follows. The heart was enlarged (weight 70 grammes), the chambers of the right side occupying about three-fourths of its bulk. A normal inferior vena cava and a dilated superior vena cava entered the dilated right atrium. There was a normal coronary sinus, and the left atrium was small and no great vessels entered it. From each lung a single pulmonary vein passed medially and joined with its fellow just below and anterior to the middle of the left main bronchus; the resultant vessel turned upwards and joined the left innominate vein and this dilated vessel joined its fellow in the usual fashion to form the superior vena cava. The foramen ovale was partly closed (orifice 0·5 cm. diameter), and the tricuspid valve was bicuspid. The ductus arteriosus was closed and the right ventricle was hypertrophied, but

there were no other cardiac anomalies. The lungs were congested and showed evidence of bronchopneumonia.

Thus the case was one of total connexion of the pulmonary veins to the left innominate vein via a "left superior vena cava".

CASE II.—A male, aged one month, was admitted because he became exhausted on sucking and had an occasional cough, and because his mother's Wassermann reaction was positive. He showed no clinical, radiological or serological evidence of syphilis, but he was dyspnœic at rest and slightly cyanotic, with tachycardia of 160, an enlarged heart with an epigastric thrust of the right ventricle, a widely-split second heart sound at the base, and a systolic murmur in the third left interspace at the sternal border. Pyrexia, chest signs and an enlarged liver were present. The electrocardiogram showed right ventricular and probable right atrial hypertrophy, and X-ray examination of the chest showed an enlarged heart with the cardiac apex lifted from the diaphragm and plethoric lung fields (Figure III).

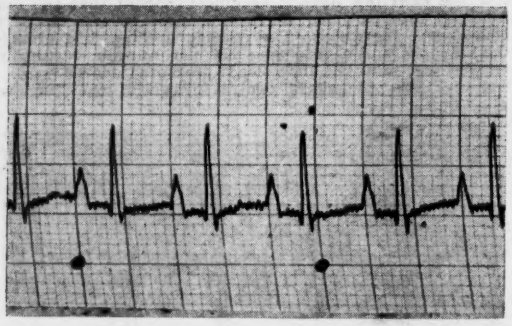

FIGURE IV.
Lead II in Case III, showing "P pulmonale" pattern.

In spite of digitalis and mercurial diuretics, his condition deteriorated, and he died two weeks after admission to hospital, at the age of six and a half weeks.

The essential autopsy findings were as follows. The heart was enlarged (weight 70 grammes) due to dilatation and hypertrophy of the right atrium and right ventricle. The foramen ovale was patent. No great vessels entered the left atrium, but beside the normal superior and inferior venæ cavæ the right atrium was entered by a large pouch at the site of the coronary sinus opening. This pouch had muscular walls continuous with the right atrial myocardium, and the coronary veins entered it by separate openings, so that this structure would appear to be a dilated and hypertrophied coronary sinus. A single pulmonary vein arose from each lung and opened individually into this coronary sinus. The heart was otherwise normal, though the ductus arteriosus was dilated in its mid-portion and was filled with recent ante-mortem clot. There were congestive changes in the liver and lungs.

Thus the case was one of complete connexion of the pulmonary veins to the right atrium via the coronary sinus.

CASE III.—A male, aged 10 days, presented with the history that on his second post-natal day he exhibited features of cerebral irritation, and had then developed central cyanosis and œdema of the legs and sacrum and hepatomegaly, and had been given digitalis. On his admission to hospital the essential findings were tachypnœa, a pulse rate of 140 per minute, elevated venous pressure, œdema as mentioned above, and a triple rhythm at the apex. As his cardiac state was controlled his cyanosis became variable, and on one occasion a doubtful systolic murmur was heard; he was finally discharged from hospital at the age of eight weeks. The electrocardiogram had shown evidence of right atrial (Figure IV) and right ventricular hypertrophy, and an appreciable *Q* wave in lead V3R on one occasion (Figure V). A skiagram taken after his failure had been controlled showed a cardiac outline within normal limits, and increased markings at the right base, though in retrospect the heart seemed rather "box-shaped" (Figure VI).

Ten weeks later he returned, having become cyanotic and œdematous again. He was underweight and his cardiac findings were as before, but there was a systolic murmur that was not well localized along his left sternal border. His cardiac failure proved refractory, and three weeks later he died, at the age of four and a half months.

The essential autopsy findings were as follows. There was gross cardiomegaly due to hypertrophy and dilatation of the right atrium and ventricle. The left atrium was small and none of the great vessels entered it. As in the previous case, the right atrium was entered by a dilated coronary sinus as well as by normal superior and inferior venæ cavæ. However, in this case each lung gave origin to a single venous trunk, and these joined to form a single vessel which then entered the coronary sinus (Figure VII). The foramen ovale was almost obliterated (opening 0·4 cm. in diameter), the ductus arteriosus was closed, and the tricuspid valve was bicuspid. Microscopically, the left ventricular myocardium showed minute foci of degeneration with replacement fibrosis, and there was mild pericardial inflammation. Elsewhere there was evidence of chronic passive venous congestion with bilateral pleural effusions.

Thus there was complete connexion of the pulmonary veins to the right atrium via the coronary sinus.

CASE IV.—A male, aged 17 days, was admitted to hospital with the history that since birth he had experienced considerable respiratory distress while feeding. At birth he was somewhat blue about the lips, but there was no difficulty in resuscitating him.

On examination he was cyanotic with cold extremities. There was tachypnœa, with poor basal air entry. No cardiac murmurs were heard. An X-ray examination of the chest

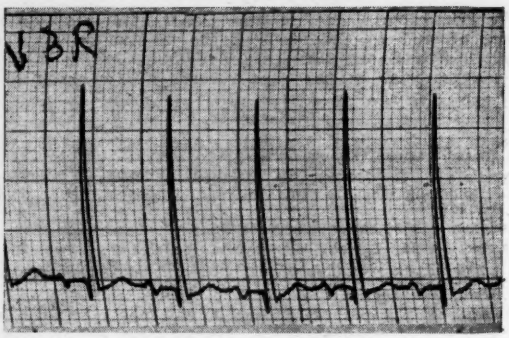

FIGURE V.
Lead V3R in Case III, showing an obvious *Q* wave over the right ventricle.

showed no pulmonary or cardiac pathological abnormalities. An X-ray examination with a barium swallow showed a normal œsophagus, stomach and duodenum. Bilateral subdural taps revealed no effusions or hæmatomata.

A blood culture grew *Staphylococcus aureus*, and a catheter specimen of urine also grew this organism. The baby developed a swinging temperature and some evidence of right pulmonary collapse, and a diagnosis of staphylococcal septicæmia and pneumonia was made.

Treatment with "Achromycin", later streptomycin and then chloramphenicol was instituted. The baby progressively deteriorated and died at the age of 26 days. No electrocardiographic examination had been performed.

The essential autopsy findings were as follows. The heart was enlarged (weight 35 grammes) due to hypertrophy and dilatation of the right-sided chambers, both left atrium and left ventricles being smaller than normal. No great vessels entered the left atrium, which received blood only through a defect 6 mm. in diameter in the posterior part of the interatrial septum. Each lung gave rise to a single venous trunk, and these united in the midline to form a single vessel, which ran downwards to enter the right atrium just above the site of entrance of the inferior vena cava. Both venæ cavæ and the coronary sinus opened by their normal orifices. There was no other abnormality in the heart and the great vessels except that the ductus arteriosus was patent. The lungs were congested and there was patchy atelectasis.

Thus the case was one of complete anomalous pulmonary venous connexion to the right atrium.

Discussion and Review of Literature.

Total anomalous pulmonary venous connexion is a relatively rare condition; figures for its incidence range

from 0·2% of cases of congenital heart disease (Wood, 1956), through 0·4% in Maud Abbott's series of 1000 cases (1936), to 2·0% (Mustard, 1957; Darling *et alii*, 1957); but Du Shane's (1956) incidence of 1·6% in 506 cases of infants and children with congenital heart disease attending the Mayo Clinic in a two-year period may be considered a reasonable modern figure.

Our cases are examples of the commoner varieties of the anomaly; in point of fact the sites of drainage in reported cases have been as shown in Table I. Two of

FIGURE VII.

The heart of the patient in Case III seen from behind: 1, wedges point to some coronary veins opening into the coronary sinus, the lateral wall of which is removed; 2, common pulmonary vein; 3, right atrium and ventricle.

our patients had an associated malformation, both having a patent ductus. Other congenital cardio-vascular anomalies are found in 34% of the reported cases (interatrial communication being an integral part of the anomaly and invariably present). The more common of these associated abnormalities are shown in Table II.

TABLE I.

Sites of Drainage in Cases Proved at Autopsy or at Operation.

Site of Drainage.	Number of Cases.	Percentage.
Left superior vena cava	61	36·6
Right superior vena cava	19	11·4
Right atrium	27	16·2
Coronary sinus	18	10·8
Portal vein	15	9·0
Ductus venosus	4	2·4
Azygos vein	2	1·2
Right duct of Cuvier	2	1·2
Inferior vena cava	3	1·8
Sinus venosus	1	0·6
Right atrium *plus* superior vena cava	4	2·4
Left innominate *plus* superior vena cava	2	1·2
Portal vein *plus* superior vena cava	2	1·2
Coronary sinus *plus* left innominate vein	2	1·2
Inferior vena cava *plus* left innominate vein	1	0·6
Abdominal veins	2	1·2
Lost	3	1·8
Total	168	—

The embyology has been adequately reviewed in the past (Brantigan, 1947; Edwards, 1953; Neill, 1956), and there is little that we could presume to add except perhaps to join with recent authors (e.g., Gott, 1956) in mentioning that the nomenclature is not quite as precise as it might be. (Figures VIII and IX show the genesis of the more common varieties in a highly diagrammatic fashion.)

Males outnumber females in the published cases by 92 to 66, i.e., 1·4:1 (we have three males and one female); but for cases connecting to a left superior vena cava the sex ratio is 1·9:1, for those connecting to the portal vein 5:1, and for the remainder close to 1:1.

The age of the patients at death, or at the time of reporting, is as shown in Figure X, from which it may be seen that 63% are aged less than one year, and of these all but 3% are dead. Our four cases fall into this group. Of 70 patients older than one year, 32, and probably 37, were alive when reported. The oldest living patient was aged 52 years (Bruwer, 1956). Thus,

TABLE II.

The Commoner Associated Abnormalities Anatomically Diagnosed.

Abnormality.	Number of Cases.	Percentage.
Patent ductus arteriosus	31	19·0
Cor biloculare	6	3·6
Dextrocardia	6	3·6
Pulmonary stenosis	5	3·0
Transposed great veins	5	3·0
Ventricular septal defect	4	2·4
Transposed aorta	4	2·4
Single ventricle	3	2·0
All cases anatomically diagnosed	163	—

it seems that the anomaly either proves speedily lethal, as it does in half the cases inside six months, or, in the survivors, it may be compatible with a quite moderate length of survival with reasonably mild and non-progressive symptoms.

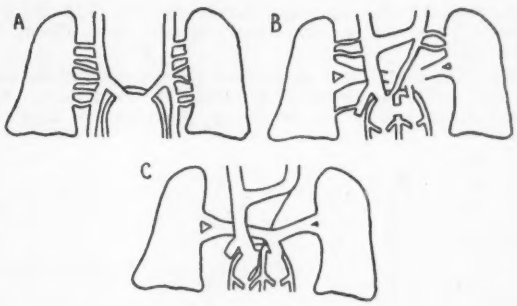

FIGURE VIII.

Normal development. A: Communication between the pulmonary plexus and the pre-caval and post-caval systems. B: Pulmonary-caval communications persist. Definitive pulmonary veins are forming and growing toward the venous outgrowth from the developing left atrium. C: The left pre-caval vein becomes the vein of Marshall and enters the coronary sinus. The pulmonary venous trunk is still to be incorporated into the left atrium to leave four definitive pulmonary veins.

The clinical features in our cases were reasonably typical — the failure to thrive, which is common in infant cases; dyspnœa, which has occurred in 78% of 58 cases (though, in the patients who survive some years, this effort intolerance may remain stationary over long periods), was present in all four; chronic or recurrent respiratory infections (25% of cases) were present in three.

In all four cases there was cyanosis, which occurs in 86% (though this figure includes patients in cardiac failure), but none showed the clubbing that occurs in one third of published cases, though perhaps this had not had time to develop. In the literature cardiac enlargement is mentioned in 45%, precordial bulging in 28%, and palpable right ventricular overaction in 21%, but these figures are less than the true incidence because clinical features are not recorded in detail in many instances. The auscultatory features in 111 cases are

shown in Table III, and it can be seen that our cases are reasonably typical.

Table IV shows the electrocardiogram abnormalities present in 84 cases, the incidences being on the low side of the true figures in some instances because of the unavailability of part of the information in some reports. The *QR* pattern in the right ventricular surface leads, which Keith *et alii* (1954) think of diagnostic importance, was present to some extent in lead V3R in our Case I, was obvious in Case III, and was absent in Case II.

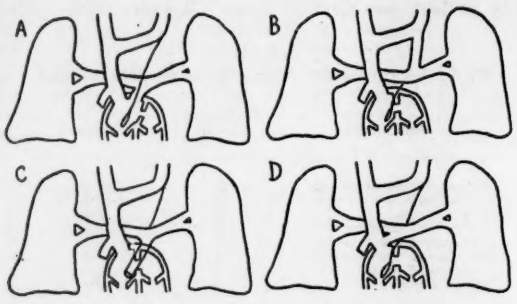

FIGURE IX.

The more common anomalies. A: Pulmonary venous connexion to the right atrium due to malposition of the interatrial septum. B: Pulmonary venous connexion to the left superior vena cava; communication persists between the pulmonary plexus and the left pre-caval vein, the upper part of which remains patent. C: Pulmonary venous connexion to the coronary sinus; the lower part of the left pre-caval vein remains patent. D: Pulmonary venous connexion to the right superior vena cava. Connexion between the pulmonary plexus and the right pre-caval vein persists.

When there is total anomalous pulmonary venous connexion to a persistent left superior vena cava, the mediastinal silhouette on X-ray examination may be characteristic. This is due to the dilatation of both of the superior venæ cavæ and the communicating innominate vein producing the "figure-of-8" or "cottage loaf" heart (Figure II), which has occurred in about three-quarters of those cases in which its description might have been expected, judging from the year and the character of the report. This configuration, with an increase in pulmonary vascularity and an increase in size of the right atrium and ventricle, is pathognomonic of the abnormality. The variable nature of the mediastinal shadow in infancy, however, may preclude a radiological diagnosis in the younger age group.

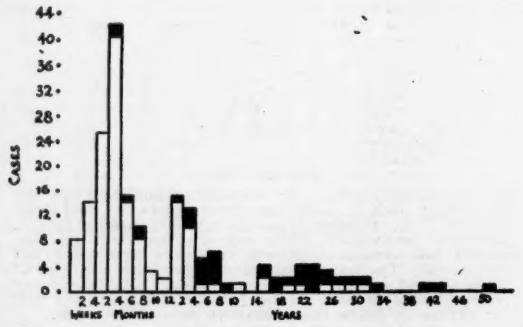

FIGURE X.

Age distribution (living patients are in solid black).

When all the pulmonary veins open into the coronary sinus or directly into the right atrium, the radiological findings will probably be no different from those of uncomplicated atrial septal defect. Dilatation of the right atrium, when it is receiving all the pulmonary venous blood directed from the coronary sinus, may result in this chamber projecting as a second shadow on the right side of the heart (Figure VI). (Taussig, 1947; Snellen and Albers, 1952; Darling *et alii*, 1957).

Except in the presence of increased pulmonary vascular resistance, the lung fields are invariably plethoric, apart from the group in which connexion is to the portal vein when the pulmonary vasculature is not increased and the heart is not enlarged, but the lung fields have a reticular appearance (Johnson *et alii*, 1958).

TABLE III.

Cardiac Auscultation Findings in 111 Cases.

Cardiac Auscultation Findings.	Number of Cases.	Percentage.
No abnormality	21	19·0
Loud pulmonary element of second heart sound ..	20	18·0
Systolic murmur:	91	82·7
Undescribed .. 17		15·5
Basal 65		59·0
Apical .. 9		8·2
Diastolic murmur: ..	19	17·3
Basal 7		6·4
Apical .. 12		10·0
Venous hum (precordial)	6	5·5
Gallop rhythm	3	2·8

Angiocardiography is of assistance when all the pulmonary veins have an anomalous insertion, though catheterization has proved even more useful, and is the usual basis upon which diagnosis is made.

The oxygenated pulmonary venous blood returns to the right heart by one or other of the channels indicated, and mixes, by the time it is in the right atrium, with the systemic venous blood; this mixed blood then passes either to the right ventricle and lungs or via the interatrial communication that is invariably present to the left atrium and thence to the periphery. Thus, there is a left-to-right and then a right-to-left shunt. On theoretical grounds, there should be an optimal size for the interatrial communication, the heart then having the least possible effort to cope with the abnormality while the needs of the body are still preserved. A larger communication will flood the systemic circulation with deoxygenated blood; a smaller one overcrowds the pulmonary circulation. No one has computed this optimal size, though it is obvious that the communication must be fairly large, and it is often said that patients die because the septal communication has an inherent tendency to close.

TABLE IV.

Electrocardiogram Abnormalities in 84 Cases.

Electrocardiogram Features.	Number of Cases.	Percentage.
Left axis deviation	1	1
Right axis deviation ..	78	93
Right bundle branch block (complete and incomplete)	21	25
Right ventricular hypertrophy	51	61
Right atrial hypertrophy ..	15	18
QR pattern over right side of heart	14	17

The presence of a patent ductus arteriosus, which occurs in 20% of all cases, is said to be of hæmodynamic value (Brody, 1942; Parsons, 1952) by relieving the pulmonary overloading. In the literature, we can find no case in which a patent ductus was present and catheterization was performed; there is no mention of differential cyanosis in the literature, but as part of the

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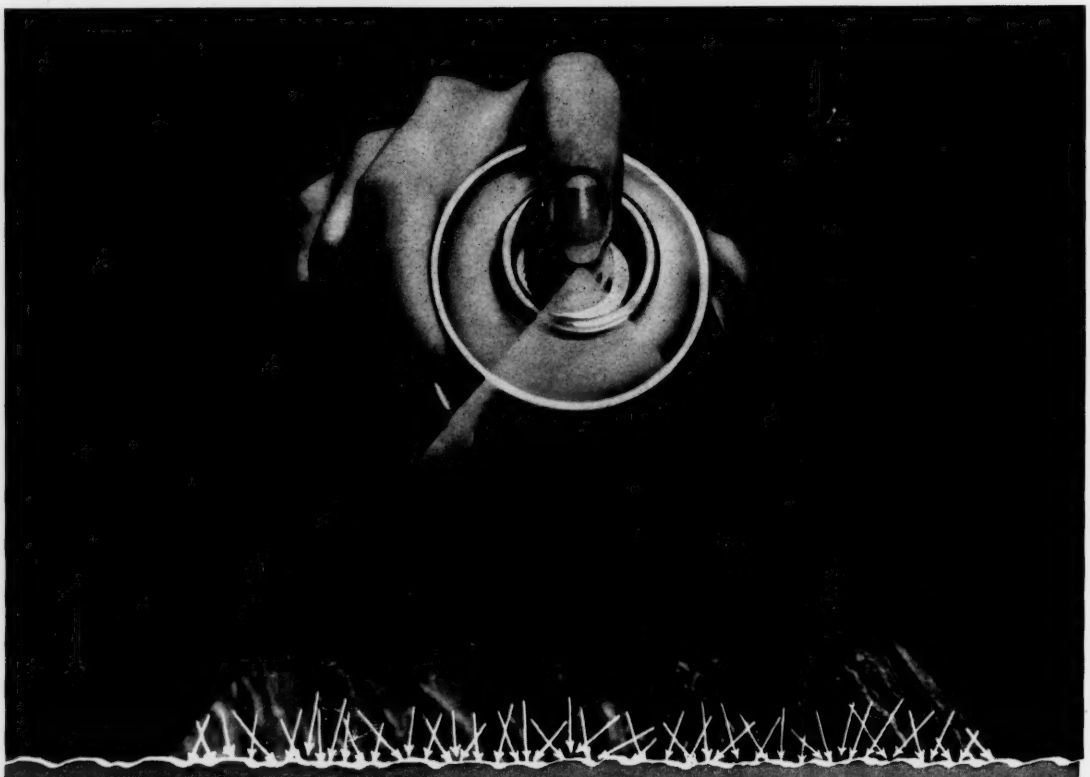

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blood that would be shunted is already fully oxygenated, this may not necessarily occur. In general, we can only repeat this observation for what it is worth, noting first that, in a few cases on catheterization, the pulmonary arterial pressure is at least in the vicinity of the systemic, so that the right-to-left shunt could occur; and secondly that, in 25 cases in which the age is given and a patent ductus is present, only two patients (8%) could survive to the age of six months, whereas 50% of all the patients survived this age, so that the presence of the patent ductus seems to have been scarcely beneficial in so far as over-all survival goes, though it may have improved the survival time in individual cases.

The mean oxygen saturation in systemic arterial blood is 85%. As Taussig (1947) first pointed out, the oxygen saturation in all cardiac chambers and in systemic artery blood should be identical, but the saturation of right heart blood is greater by 5% than systemic arterial blood in 30% of cases, which Sepulveda (1955) and Burchill (1956) explain is due to the passage of unoxygenated inferior vena cava blood close to the interatrial communication and its preferential shunting through this orifice.

There was pulmonary hypertension in 70% of 43 cases; pulmonary flow averaged 10 litres per minute per square metre; systemic flow was normal, averaging 3·5 litres per minute per square metre.

In our cases, as in the majority, the differential diagnosis was from atrial septal defect, particularly that complicated by pulmonary stenosis or hypertension, or bi-directional shunt. While, unless anomalous veins are seen on X-ray examination, the diagnosis usually rests on catheterization particularly and on angiocardiography (being thus made for the first time in 1948 by Johnson and McRae), there are several clinical features which may make suspect the diagnosis of atrial septal defect. Cyanosis and effort intolerance are unusual in simple defects, as is electrocardiographic evidence of right atrial hypertrophy, and if there is complicating pulmonary stenosis or hypertension, the radiological finding of pulmonary plethora is surprising. Transposition of the great vessels and cor triloculare biventriculare may require consideration.

It is an interesting feature that in the commonest group — those that drain into a left superior vena cava —there is a high male incidence, a characteristic radiological appearance, a lower incidence of associated malformation (14% to 46%), and a more favourable prognosis (of cases prior to 1950, to exclude the effect of surgery, 33% survived their first year to 15% of the remaining cases), though functionally they do not differ from the remainder. So, perhaps, there is some justification for regarding these cases as a sub-group within the malformation, and four authors have published series of this variety alone (*Gardener, 1953; Whitaker, 1954;* Levin, 1954; Mustard, 1957).

Recently there has been a tendency to look upon those cases draining infradiaphragmatically as a separate group (Johnston *et alii*, 1958; Darling *et alii*, 1957), because of the male preponderance (5:1 in the commonest group — those that connect with the portal vein) the poor survival (no patient living longer than three months) and the characteristic X-ray appearance.

The prognosis in the individual case seems to depend on the infant's ability to negotiate the first half-year of life. If he can attain this in moderate condition, his *outlook is quite reasonable, and he is coming to an age* at which investigation is facilitated and surgery has been successful.

It is only recently that surgery has had anything to offer these patients. Of 39 operations recorded, nothing *was attempted at 10 operations, 15 patients died, and* beginning with Muller (1951), there have been 14 successes, in seven of which (Gott, 1956; Burroughs, 1956; Lewis, 1956) the correction was *complete and in seven,* partial. The youngest successful complete correction was in a four-month-old child (Gott, 1956), and this seems to point the way to the relief of the appalling mortality in the infant cases of this anomaly.

Summary.

Four cases of total anomalous pulmonary venous connexion are reported, making 196 in the literature (five Australian). This abnormality occurs in 1% to 2% of patients with congenital heart disease, and in three males for every two females; it kills 60% of those affected before they reach one year of age, and clinically resembles somewhat atrial septal defect, though there is often sufficient evidence to suggest that this diagnosis is unsatisfactory.

Anatomical, clinical and physiological data have been computed from the figures available in the literature.

Fourteen cases have been improved by surgery, there being seven complete anatomical corrections recorded, and it is in surgical endeavour that hope lies for the salvation of the 50% of infants who die in their first six months of life.

Acknowledgements.

We wish to thank Dr. T. R. Biggs, Dr. G. Stable and Dr. W. D. Cooke, under whose care these patients were; Dr. A. D. Pye, for permission to publish hospital records; Dr. A. W. Pound, for the use of the facilities of the pathology department; and Dr. J. M. Sutherland, for his advice and criticism.

References.

ABBOTT, M. E. (1936), "Atlas of Congenital Heart Disease", The American Heart Association, New York.

BRANTIGEN, O. C. (1947), "Anomalies of Pulmonary Veins: Their Surgical Significance", *Surg. Gynec. Obstet.*, 84: 653.

BRODY, H. (1942), "Drainage of Pulmonary Veins into Right Side of Heart", *Arch. Path. (Chicago)*, 33: 221.

BRUWER, A. (1956), "Roentgenologic Findings in Total Anomalous Pulmonary Venous Connexion", *Proc. Mayo Clin.*, 31: 171.

BURCHILL, H. B. (1956), "Total Anomalous Pulmonary Venous Drainage: Clinical and Physiologic Patterns", *Proc. Mayo Clin.*, 31: 161.

BURROUGHS, J. T., and KIRKLIN, J. W. (1956), "Complete Surgical Correction of Total Anomalous Pulmonary Venous Connexion: Report of Three Cases", *Proc. Mayo Clin.*, 31: 182.

DARLING, R. C., ROTHNEY, W. B., and CRAIG, J. M. (1957), "Total Pulmonary Venous Drainage into the Right Side of the Heart", *Lab. Invest.*, 6: 44.

DU SHANE, J. W. (1956), "Total Anomalous Pulmonary Venous Connexion: Clinical Aspects", *Proc. Mayo Clin.*, 31: 167.

EDWARDS, J. E. (1953), "Symposium on Anomalous Pulmonary Venous Connection (Drainage): Pathologic and Developmental Considerations in Anomalous Pulmonary Venous Connection", *Proc. Mayo Clin.*, 28: 441.

GARDENER, F., and ORAM, S. (1953), "Persisting Left Superior Vena Cava Draining Pulmonary Veins", *Brit. Heart J.*, 15: 305.

GOTT, V. L., LESTER, R. G., LILLEHEI, C. W., and VARCO, R. V. (1956), "Total Anomalous Pulmonary Return: an Analysis of 30 Cases", *Circulation*, 13: 543.

GRAHAM, P. M. (1944), "Rare Congenital Abnormality of Pulmonary Veins and Heart", MED. J. AUST., 2: 545.

HEALEY, J. E., jr. (1952), "Anatomic Survey of Anomalous Pulmonary Veins: Their Clinical Significance", *J. thorac. Surg.*, 23: 433.

JOHNSON, A. L., and MCRAE, D. L. (1948), "Combined Use of Angiocardiography and Cardiac Catheterisation in Diagnosis of Congenital Anomalies of Cardiovascular System", *Pediatrics*, 2: 643.

JOHNSTON, A. L., WIGLESWORTH, F. W., DUNBAR, J. S., SIDDOO, S., and GRAJO, M. (1958), "Infradiadiaphragmatic Total Anomalous Pulmonary Venous Connexion", *Circulation*, *17: 340.*

KEITH, J. D., ROWE, R. D., VLAD, P., and O'HANLEY, J. H. (1954), "Complete Anomalous Pulmonary Venous Drainage", *Amer. J. Med.*, 16: 23.

LEVIN, B., and BORDEN, C. W. (1954), "Anomalous Pulmonary Venous Drainage into the Left Vertical Vein", *Radiology*, *63: 317.*

LEWIS, F. J., VARCO, R. L., TAUFIC, M., and NIAZI, S. A. (1956), "Direct Vision Repair of Triatrial Heart and Total Anomalous Pulmonary Venous Drainage", *Surg. Gynec. Obstet.*, 102: 713.

MULLER, W. H. jr. (1951), "Surgical Treatment of Transposition of Pulmonary Veins", *Ann. Surg.*, 134: 683.

MUSTARD, W. T. (1957a), "The Diagnosis and Treatment of Complete Anomalous Pulmonary Venous Drainage", *Arch. Dis. Childh.*, 32: 1.

MUSTARD, W. T., and DOLAN, F. G. (1957b), "The Surgical Treatment of Total Anomalous Pulmonary Venous Drainage", *Ann. Surg.*, 145: 379.

NEILL, C. A. (1956), "Development of the Pulmonary Veins", *Pediatrics*, 18: 880.

SEPULVEDA, G., LUKES, D. S., and STEINBERG, I. (1955), Anomalous Drainage of Pulmonary Veins: Clinical, Physiologic and Angiocardiographic Features", *Amer. J. Med.*, 18: 882.

SNELLEN, H. A., and ALBERS, F. H. (1952), "The Clinical Diagnosis of Anomalous Pulmonary Venous Drainage", *Circulation*, 6: 801.

TAUSSIG, H. B. (1947), "Congenital Malformations of the Heart", The Commonwealth Fund, New York.

WHITAKER, W. (1954), "Total Pulmonary Venous Drainage Through Persistent Left Superior Vena Cava", *Brit. Heart J.*, 16: 177.

WOOD, P. H. (1956), "Diseases of the Heart and Circulation", Eyre and Spottiswood.

CONGENITAL DYSPLASIA OF THE HIP.

By G. S. SANTOW,

Sydney.

THE vast majority of congenital abnormalities are readily recognized by lay people who have to handle infants. Mothers are apt to scrutinize their newly born attentively and of course very rarely miss anything. Nurses and the medical practitioner with average awareness will detect practically all that is a deviation from what is regarded as the norm. Still there remain a few and commonly considered rare anomalies, which are more often missed than not. Congenital dysplasia of the hip is to be mentioned in the first place in this connexion, as it is a relative rarity in predominantly Anglo-Saxon communities —at least rare in comparison with some other racial and geographical groups, in which cases of this type are more frequently encountered.

The question may be raised whether it is justified to describe one such case. The apology offered is threefold. First the diagnostic features which are to be considered in this case would have been much the same had we observed many more instead of just one. Secondly, this patient has been known to me for a period of 15 years, which by the length of time of the observation enhances the worth of whatever conclusions we are trying to draw. Thirdly (and this seems to me to be the most important reason for publishing this case), in my opinion we are dealing here with a completely preventible illness. Prevention, of course, depends on early recognition, which is not often forthcoming. Congenital dislocation of the hip is a development of untreated hip dysplasia, and the crippling associated with it is an unnecessary affliction, particularly in areas where modern medicine is practised. An illness which overlaps several specialties such as pædiatrics and orthopædics and spreads above all into the sphere of the general practitioner as well, is apt to become nobody's particular baby. By having the features of congenital hip dysplasia before one's mind, all infants, but particularly the female infants, should be examined soon after birth for signs of this anomaly.

Putti (1933) proposed that three signs should be looked for. These are shallow acetabular cavity, hypoplasia of the head of femoral epiphysis, and lateral and cranial displacement of the head of the femur. According to Hilgenreiner, the normal acetabular angle is around 20°; in congenital dysplasia this angle increases to 30° to 40° and even more.

Schinz (1952) tells us that the ossification of the epiphysis of the head of the femur appears between two and eight months after birth. Congenital dislocation of the hip originates as a congenital dysplasia of the hip joint. This condition is 1·75 times more frequent in girls than in boys. Congenital dislocation of the hip is six times as frequent in females as in males. Whilst it is relatively rare in Britain, Holland, Belgium and China, it is relatively frequent in the province of Saxony in Germany, Lombardy in Italy and also in certain districts of Hungary.

Putti (1933) begins treatment as soon as the deformity is observed, maybe even on the day of birth. He obtained a complete cure in 113 out of 119 cases of congenital hip dysplasia. Putti does not deny the occurrence of spontaneous reduction; however, he urges that such should not be expected, and treatment should be instituted in all cases at once. Delay in treatment is the cause of the overlooked subluxation and arthritis deformans as a late and crippling sequel.

Caffey *et alii* (1956) stand apart with their opinions. They have examined radiologically and clinically the hips of 622 newly born infants. In their unselected survey the acetabular angle showed considerable reduction by the time the babies had reached the age of six months. A further reduction of these angles took place by twelve months. These authors reject the traditional 30° acetabular angle as the norm for the first twelve months of life. Their conclusion that congenital hip dysplasia-predislocation cannot be determined by skin folds, limitation of abduction and the enlarged acetabular angle, is a retrograde step. This study will no doubt serve as an excuse to many to expect spontaneous reduction to take place and, of course, to defer active treatment until it is too late.

Coleman's work (1956) is most significant. He found 32 cases of hip dysplasia out of 3500 infants examined at random soon after birth. His main thesis was that this condition is recognizable at birth and that the untreated dysplasia will proceed subsequently to subluxation. Discrepancies between the radiological and the clinical findings are frequent. The apparent shortening of one limb is insufficient criterion to diagnose congenital hip dysplasia. There is no way to foretell which case is going to reduce itself spontaneously.

In cases in which the X-ray picture does not corroborate the available clinical evidence, treatment should be instituted nevertheless; it is dangerous to adopt a policy of "wait and see". Undiagnosed subluxations come to light in the late thirties in the form of disabling osteoarthritis. It is Putti's contention that 40% of the missed cases go on to this stage.

Colonna's paper (1953) contains excellent hints as to early recognition. Treatment in infancy on Putti's triangular rubber cushion or Frejka's abduction splint yields the best results. Defective development is to be looked for in the acetabulum, the innominate bone and the epiphysis of the head of the femur.

The work of Richard D. Hawkins (1952) contains a full list of what can be regarded as the earliest diagnostic signs. All babies ought to be screened. Soon after birth one very rarely sees a dislocated hip or a trochanter that is obviously high. Club feet and congenital hip dysplasia often go together. In the presence of club feet the hips should always be radiologically examined. The affected side is relatively immobilized; abduction with the hips flexed is limited. Asymmetry of skin creases and the so-called "jerk of entry" and "jerk of exit" are to be looked for. The last signs represent the sensation when the head slips in and out of the acetabulum over the iliac bone.

It is good to be precise in the matter of nomenclature. Dislocation of the hip means that there is no contact whatsoever between the femoral head and the joint cavity. Dysplasia, of course, represents a state of affairs in which all factors are present, which may lead to subluxation if the condition is left untreated. The exceptions are the cases which undergo spontaneous reduction; however, we are not to know which ones will boast eventually of this happy ending. Let me state now with emphasis that dislocation of the hip is only the consequence of such maldevelopment which deprived the acetabulum and the structure around the hip joint from the functional stimulus provided by the presence of a normal femoral head opposite the joint cavity.

On September 27, 1943, I confined Mrs. A. of a female infant. This was a normal confinement, and she left hospital after an uneventful puerperium on the tenth day. The mother brought her infant to me when she was three months old, the purpose of her call being to show me that the baby's right leg looked different from the left. On examination

there was found to be asymmetry of skin folds over the thighs and limitation of abduction of the leg flexed upon the thigh. Our suspicions aroused, the infant was sent to be radiologically examined; however, the radiologist did not consider that there was anything wrong with the baby's hips. Soon after Christmas, on January 14, 1944, that is, three weeks after the first X-ray films, a second radiologist reported congenital dysplasia of the right hip. The baby was then three and a half months old. The only radiological sign present was the apparent difference in the sizes of the epiphyses of the heads of the femurs, the right epiphysis being smaller than the left one (Figure I). Treatment was immediately commenced. (At this time, 1944, the articles quoted in this paper were not as yet published, except, of course, the original studies of Putti from Bologna in Italy.) I adopted a plan of treatment suggested by Putti, and placed the baby into an abduction splint, the angle of abduction being increased in a gradual manner (Figure II). Putti

FIGURE II.
The abduction splint.

suggested a triangular rubber cushion for these babies. As we did not have suitable rubber available during the war, the father of the baby, who was a handyman of some accomplishment, built an abduction splint out of light timber with canvas belting fixed to the hinged flanges of the splint. This abduction splint allowed us gradually to separate the baby's legs, and so treatment was continued until the baby's first birthday nine months later. The fact that such a splint is easily removable allowed the mother to wash, clean and powder the baby and again replace the splint two or three times daily. This is to be regarded as a considerable advantage over a closed plaster cast during a hot Australian summer.

Figures III, IV and V, taken in April, June and August, 1944, show convincingly the differences in size of the femoral heads. As time went on, the difference in the acetabular angles and a certain shallowness of the acetabulum became more manifest on the right side.

After the removal of the abduction splints, the child began to crawl and later to walk by the time she was respectively 18 and 20 months old. The last X-ray photograph in this series shows the film of the girl, aged 15 years (Figure VI). There are no signs of osteochondritis of the Perthes type or other changes around the hip joint. The functional stimulus provided by the presence of the head opposite the acetabulum guarantees proper development of the structures in and around the hip joint.

The treatment of this case of congenital dysplasia of the right hip, by means of Putti's abduction splint, yielded what is considered a satisfactory result.

Summary.

1. It is stated that congenital dislocation of the hip is a preventible disease.

2. The method of prevention has, as its first prerequisite, the methodical screening of all newly born infants. This will enable detection of cases for early treatment.

3. Early diagnostic signs ought to be common knowledge, particularly to the general practitioner who delivers babies.

4. Just because congenital dysplasia of the hip is a relatively rare condition, our neglect of it is not justified, neither is a boundless optimism which expects all cases to cure themselves spontaneously.

5. A case of congenital dysplasia of the hip is reported.

References.

CAFFEY, J., AMES, R., SILVERMAN, W. A., RYDER, C. F., and HOUGH, G. (1956), "Contradiction of the Dysplasia-Predislocation Hypothesis of Congenital Dislocation of the Hip through a Study of the Normal Variation in Acetabular Angles at Successive Periods of Infancy", *Pediatrics*, 17 : 632.

COLEMAN, S. S. (1956), "Diagnosis of Congenital Dysplasia of the Hip in the Newborn Infant", *J. Amer. med. Ass.*, 162 : 548.

COLONNA, P. C. (1953), "Recognition and Treatment of Hip Dysplasia in the Infant", *Surg. Clin. N. Amer.*, 33 : 1633.

HAWKINS, R. D. (1952), "Congenital Dysplasia of the Hip Joint in Early Infancy", *Sth. med. J. (Bgham, Ala.)*, 45 : 18.

PUTTI, V. (1933), "Early Treatment of Congenital Dislocation of the Hip", *J. Bone Jt Surg.*, 15 : 16.

SCHINZ, H. R., BAENSCH, W. E., FRIEDL, E., and UEHLINGER, E. (1952), "*Lehrbuch der Röntgendiagnostik*", Thieme, Leipsig and Stuttgart.

NON-VISCERAL OR ECTOPIC CALCIFICATION.[1]

By R. W. THOMPSON,
Assistant Rheumatologist, Balmain Hospital, N.S.W.

THE normal level of blood calcium varies between 9 and 11 mg. per 100 ml. of blood. Of this, approximately half is protein bound and is invariable. The remainder varies with the calcium intake, the intake of vitamin D and the state of the parathyroid glands. It is interesting that the normal range tends towards the upper limit during the summer months, and towards the lower limit in the winter. Variation in any of the controlling factors may cause disorders of calcium metabolism and give rise to abnormal deposits; for example, the deficiency diseases of rickets and osteomalacia. Excessively large or toxic doses of vitamin D cause osteoporosis of the skeleton, and give rise to gross calcifications in relation to the large body joints and in the viscera. Reversible metastatic calcifications are sometimes seen where there is an excessive intake of milk and alkali by patients with chronic peptic ulcer and renal insufficiency, and disappearance follows elimination of the excessive intake. In addition to disturbances in the metabolism of calcium itself, the close relationship of this mineral with phosphorus will lead to an exactly similar set of pictures when the metabolism of this element is disturbed. Much has been written as to the cause of the deposition of calcium salts in relation to the musculo-skeletal system. The alkalinity of certain degenerative and inflammatory tissues has been cited.

A classification of ectopic calcification may be made as follows.

1. Physiological.

2. Pathological, which may be (*a*) vascular (Volkmann's ischaemic contracture), (*b*) neurogenic, as occurs in the region of the hip joint in traumatic paraplegics, or (*c*) inflammatory. In the inflammatory group are included: (i) new bone formation in relation to septic joints; (ii) calcification in relation to bursitis in the flexor pollicis longus tendon in "tennis thumb", in the flexor carpi ulnaris tendon, giving rise to one form of writer's cramp, and in the subdeltoid area in relation to capsulitis of the shoulder; (iii) chronic inflammation, for example, calcification in relation to tuberculous joints; (iv) rheumatoid arthritis.

3. Degenerative, for example, the calcification that occurs in relation to osteoarthritic joints.

4. Traumatic. In myositis ossificans traumatica, calcium deposits, often going on to complete bone formation, are liable to occur in relation to fractures involving

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joints, especially in relation to the elbow joint in children. Such calcifications could probably be placed equally well with the vascular insufficiencies.

Ectopic calcification may occur in von Reckinghausen's disease of bone or in osteitis fibrosa cystica.

Idiopathic calcifications include calcinosis, myositis ossificans progressiva and dermato-myositis. I will now discuss briefly each of these categories, and illustrate some of them with X-ray pictures taken at St. Giles' Hospital, Lewisham Hospital, The Royal National Orthopædic Hospital and the West Middlesex Hospital of London.

Physiological calcification is seen as part of the normal process of aging, and with advancing years we must become reconciled to carrying in our costal cartilages, our nasal cartilages and in the cartilages of the trachea an insidiously increasing amount of calcium in the walls of the vascular system.

Of the pathological calcifications, I shall mention only the well-known entities in relation to septic arthritis and tuberculous lesions, and shall concentrate the discussion on the very interesting, innocent, but incapacitating calcifications that commonly occur in relation to the shoulder joint, the elbow joint and the tendons of the arm. The mere bulk of literature on this subject is sufficient indictment of our lack of complete understanding of these important conditions. In a personal communication, Brian Haynes, of Sydney, suggests a special category, post-inflammatory, to cover much of the pathological calcification under consideration.

It must be confessed that we do not know the ætiology of the condition. However, many associated factors are known, such as recurrent trauma, even of moderate severity such as occurs in a painter or a plasterer in his normal occupation, and direct violence, as of a sudden fall on the shoulder. The calcification and pain often said to be of mysterious cardiac origin occurring in patients who are confined to bed for any length of time as, for example, after a coronary infarct, probably in fact come into the first category, and are due to their leaning continuously on their elbows (Dr. Charles A. Shearer in a personal communication). Little opportunity is available to see at autopsy the pathological condition of these painful shoulders. However, in one such case, there was tremendous thickening of the synovial membrane, with all the appearances of chronic non-infective synovitis.

It is interesting that in another case of calcification of the rotatorcuff, needling of the shoulder showed that in the first 24 hours there were 8 mg. of calcium per 100 c.cm. — that is, the normal amount of blood calcium. After eight days it rose to 60 mg., and after three weeks to 1500 mg.

To return to the theory of Haynes, he considers rheumatic valvulitis, tennis elbow, medial condyle syndrome and painful shoulder syndrome — soft tissue conditions which are from time to time complicated by calcification — to be analogous inflammatory conditions in so far as the inflammatory hyperæmia is the basic pathological condition. It does not appear necessary to invoke hypothalamic theories to account for these conditions.

There is vividness in the severity of the clinical symptoms in the acute phase, the patient having a dread of the slightest movement, active or passive. In a severe case, there is a complete absence of movement of the joint, and the patient wears the countenance of agony. Even the slightest movement, as, for example, jarring of the shoulder whilst walking down a step, can cause pain.

There is no relationship whatsoever between the amount of calcium present and the severity of the clinical symptoms, and it is reasonable to presume that it is an inflammatory process, and not the presence of calcium, which gives rise to the symptoms.

There is no need to treat a calcium deposit. There is an urgent need to treat a severe painful shoulder with or without a calcium deposit. The natural history of these conditions left to their own resources is one of about 18 months, during which the painful stiff shoulder loses its pain and becomes pain-free and frozen, and then movement gradually returns. It may leave in its wake atrophic contracted muscles, a shrunken joint capsule, ligamentary shortening and periarticular adhesions, a result not of the disease process itself but of disuse atrophy.

Modern therapy is inclining away from the "rest it and wait" attitude of bygone days. Intraarticular injection of 2 c.cm. of procaine and up to 100 mg. of hydrocortisone is often dramatic in its results. The injection should be made through the front of the joint, along the line of the biceps tendon, with the arm held, if possible, in full external rotation. It is worth persisting with injections at weekly intervals if the pain should return after the first. As many as five such injections are sometimes necessary in severe cases. In selected cases in which the pain has departed to a large extent but the frozen shoulder remains, manipulation under anæsthesia and the injection of hydrocortisone into the joint will do much to restore a normal joint.

The idiopathic calcifications are interesting, rare and, in the main, untreatable. Examples are shown of calcinosis, a rare disease in which there is a deposit of calcium in the soft tissues. Two types are known, universalis and circumscripta—the latter being the more common.

CASE I.—A man, aged about 40 years, is employed as an electrician. From time to time he suffers painful foci on the hands particularly, but often on the knees, back and feet. These, when opened, gave up to half a cup of material resembling thick icing sugar. Figure I is a skiagram of the patient's hands. This case is an example of calcinosis generalisata.

Myositis ossificans progressiva is again of unknown ætiology, and is a very interesting disease in that, together with the generalized deposit of calcium throughout the body, it often occurs as acute inflammatory episodes, and in many instances is mistaken at first for cellulitis. There is congenital shortening of the first metacarpal and first metatarsal.

CASE II.—A girl, aged about 23 or 24 years, had suffered generalized calcification from birth. Skiagrams were taken, and she died shortly after as a result of pneumonia. The films show myositis ossificans generalisata (Figure II).

The third disease in this trinity is dermato-myositis, which incorporates the features of both the other conditions, in that there is calcification both in the muscles and subcutaneously.

CASE III.—Skiagrams of the arms of the patient, aged 17 years, showed massive calcification both in the muscles and subcutaneouly (Figure III). The patient died shortly after from a respiratory infection. This case is an example of dermato-myositis.

The following cases are examples of other forms of ectopic calcification.

CASE IV.—A woman, aged 46 years, had had a tuberculous hip joint 45 years before. X-ray examination of her foot showed hypertrophic bone reaction at the site of the tuberculosis at the first metacarpophalangeal joint.

CASE V.—A man, in his fifties, had an X-ray examination because of back pain, and a calcified nodule was discovered in the region of the sacro-iliac joint. Tomography showed this to be a calcified lymph gland not attached to bone — an example of ectopic calcification.

CASE VI.—This case was an example of marble bone disease of Albers-Schonberg.

CASE VII.—A man, aged 45 years, complained of severe pain in the shoulder for six months. He had slight limitation of movement; and pain was worse at night, keeping him awake. On examination, there was extreme tenderness of the biceps tendon. He had mitral stenosis, and his heart was fibrillating. X-ray examination showed a bone infarct. At operation, the biceps tendon was freed in its groove. The synovial sheath was extremely thickened. His pain disappeared completely. This case is an example of bone infarct.

CASE VIII.—A man, aged about 30 years, had had an operation two years previously for removal of a simple tumour in the region of the anterior superior iliac spine. X-ray examination showed much calcification at the site of operation. This case is an example of myositis ossificans traumatica.

ILLUSTRATIONS TO THE ARTICLE BY A. I. RHYDDERCH.

FIGURE I.

FIGURE II.

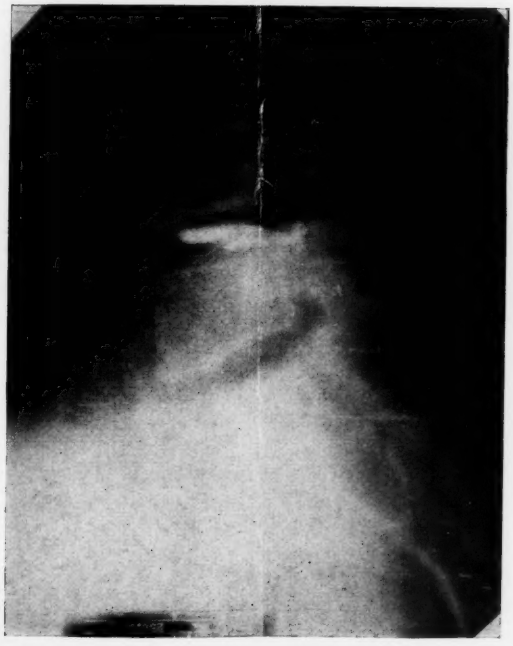


FIGURE III.

FIGURE IV.

ILLUSTRATIONS TO THE ARTICLE BY A. I. RHYDDERCH.

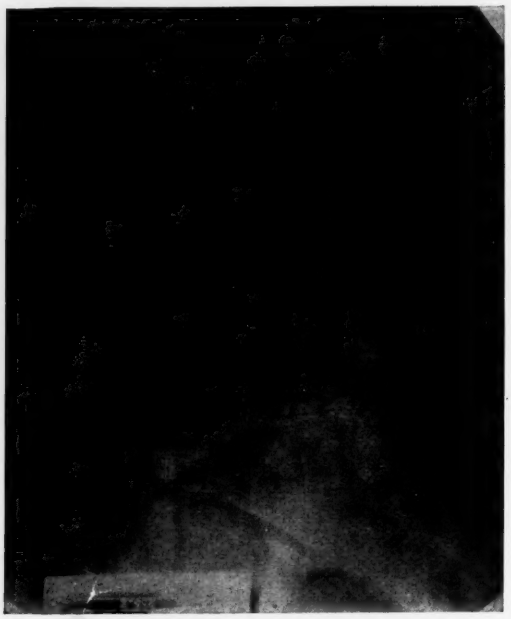


FIGURE V.

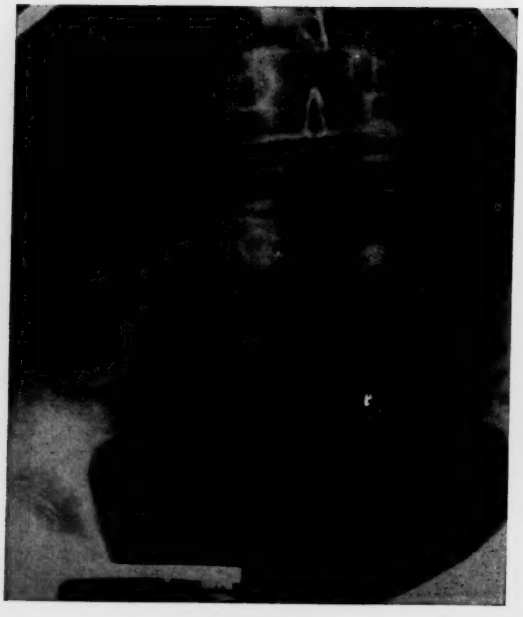


FIGURE VI.

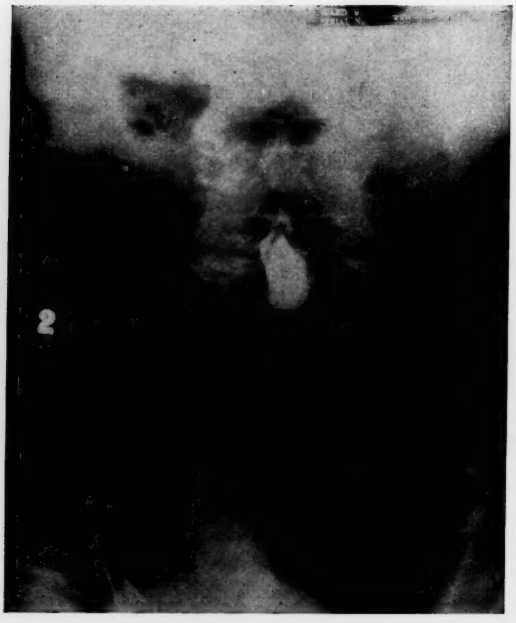


FIGURE VII.

ILLUSTRATIONS TO THE ARTICLE BY M. J. EADIE, J. H. HOOD, L. F. MASEL, AND M. E. B. MURPHY.

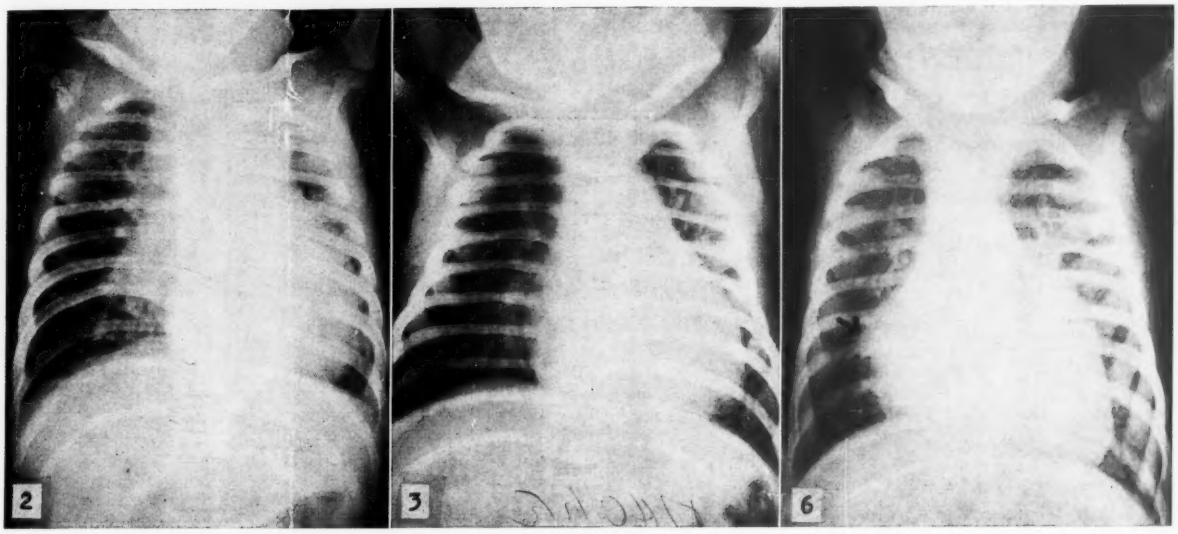


FIGURE II.—Skiagram of the chest of the patient in Case I, showing the "figure-of-8" heart of pulmonary venous connexion to a persisting left pre-caval vein. FIGURE III.—Skiagram of the chest of the patient in Case II, showing the enlarged heart with the cardiac apex lifted from the diaphragm and plethoric lung fields. FIGURE VI.—Skiagram of the chest of the patient in Case III, showing the dilatation of the right atrium at the upper part of the right cardiac border due to the stream of blood being directed towards this wall from the coronary sinus.

ILLUSTRATIONS TO THE ARTICLE BY G. S. SANTOW.

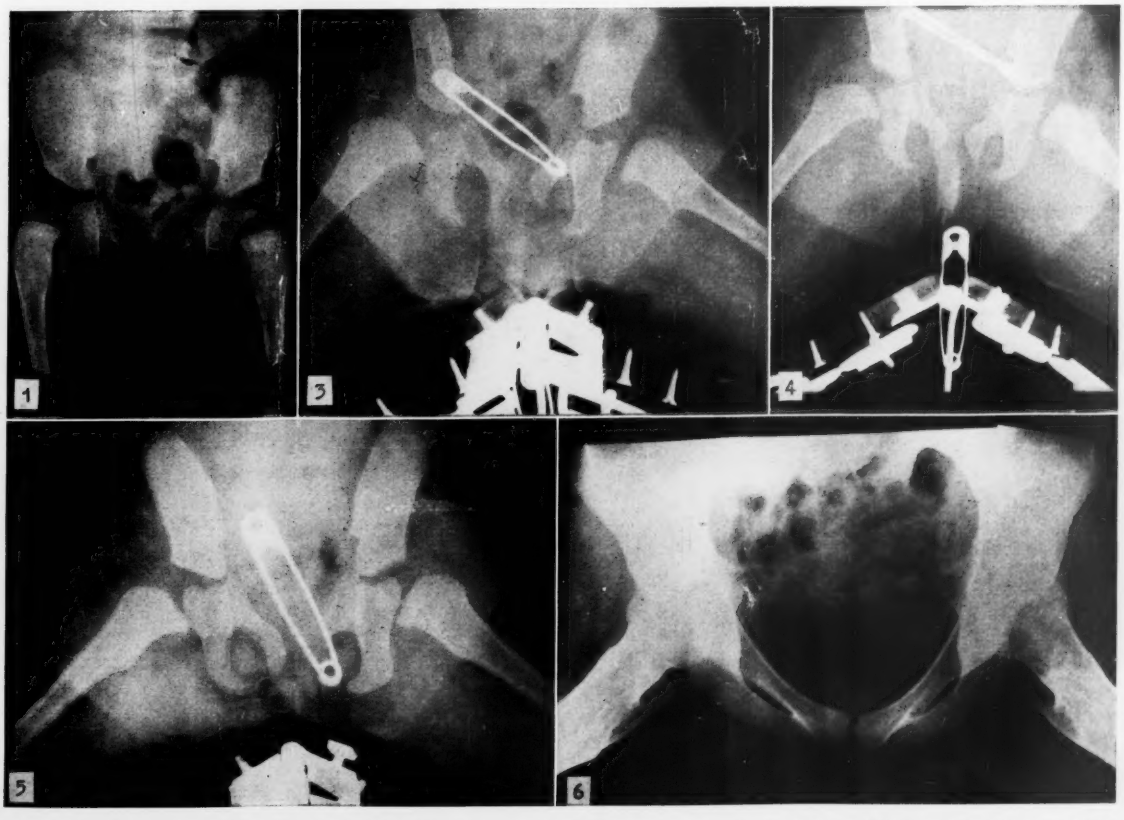
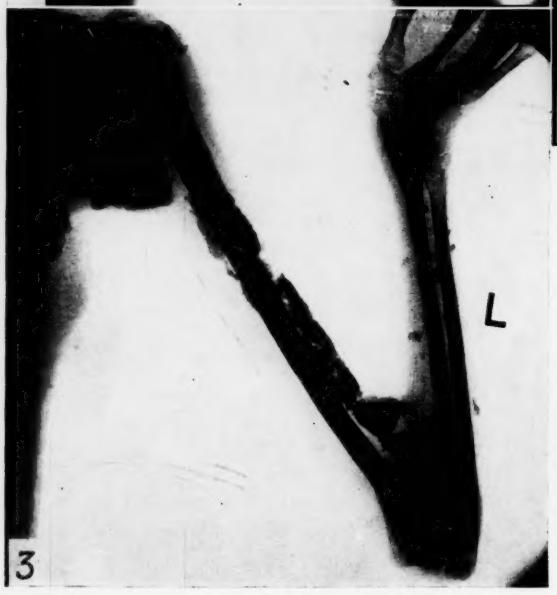
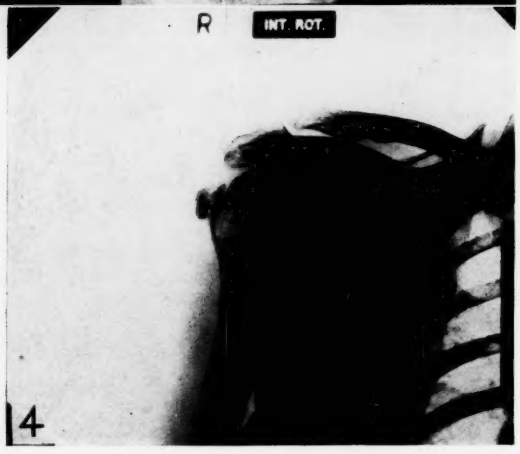


FIGURE I.—Skiagram taken on January 14, 1944, showing the difference in the sizes of the epiphyses of the heads of the femurs. FIGURE III.—April 26, 1944. FIGURE IV.—June 7, 1944. FIGURE V.—August 2, 1944. FIGURE VI.—September, 1958.

ILLUSTRATIONS TO THE ARTICLE BY R. W. THOMPSON.





CASE IX.—In this case, X-ray examination showed a hypertrophic secondary deposit in the cuboid bone from an adenocarcinoma of the kidney.

CASE X.—A man, aged 28 years, complained of swelling in the right knee for two years, which was recurrent and painless. He had a soft boggy effusion, and limitation of movement. The interior of the synovial membrane was impregnated with calcified nodules. A sub-total synovectomy was performed. This case is an example of synovial osteochondromatosis.

CASE XI.—A man, aged 45 years, had had pain in the right shoulder for one year. On examination on October 10, 1958, he had practically no movement, with a completely frozen shoulder. Two injections of hydrocortisone and procaine were given. By October 14 he was free of pain, and had a 60° abduction. By October 20 he had almost complete movement. This case is an example of calcification in capsulitis of the shoulder (Figure IV).

It is probably true to say that this alone of the disorders of calcium metabolism is fully understood. A tumour of the parathyroid glands, usually a benign adenoma, varies occasionally; carcinoma, and sometimes simple hyperplasia, causes generalized decalcification of the skeleton with the formation of psuedo-cysts. The calcium absorbed from the bones is excreted in large amounts, and tends to give rise to deposits of calcium in unusual sites, but especially in the kidneys. The removal of the tumour causes complete regression of the bone condition with recalcification and absorption of the extraneous deposits, although the kidney stones sometimes have to be treated as separate surgical entities.

Conclusion.

A brief survey has been made of some features of abnormal calcification and of the disease entities associated with them. The condition of calcification in relation to the shoulder joint has been discussed in some detail as being the most typical example of the treatable conditions. It must be confessed, however, that our knowledge of the mechanism of the deposition of calcium is still very slight, so that a rational basis for therapy by reversion of the mechanism is not yet available. However, the example of von Recklinghausen's disease gives hope that ultimately they may all be related to some treatable function of the parathyroid glands.

Again, to quote Codman, calcification is difficult to define, difficult to treat and difficult to explain. There is some solace in the knowledge that it is unnecessary to treat calcification as such, but only the painful arms and shoulders of our patients.

Acknowledgements.

I wish to record my thanks to Mr. Charles Shearer, Clinical Assistant, Orthopædic Surgeon, Royal North Shore Hospital of Sydney.

Bibliography.

COWAN, I. I., and STONE, J. R. (1952), "Painful Periarticular Calcifications at Wrist and Elbow. Diagnosis and Treatment", *J. Amer. med. Ass.*, 149: 530.

HARPER, H. (1952), "Calcinosis—With a Description of a Case of Calcinosis Circumscripta", *Brit. J. Radiol.*, 25: 328.

HAYNES, B. G. (1957), "Psychotherapy in General Practice", *MED. J. AUST.*, 2: 777.

HOLT, E. P., and ODELL, R. T. (1952), "Peritendinitis Calcarea", *Sth. med. J. (Bgham, Ala.)*, 45: 400.

MCCARROLL, R. (1957), "Some Clinical Observations in Problems of Soft Tissue Calcification", *A.M.A. Arch. Surg.*, 74: 578.

MILLER, J. W., HANF, R. W., and WALKER, J. H. (1951), "Acute Soft Tissue Calcification of Joints other than the Shoulder", *Ann. rheum. Dis.*, 10: 490.

OLDFIELD, M. C. (1951), "'Tennis Thumb' Tendinitis with Calcification in Flexor Pollicis Longus", *Lancet*, 1: 1151.

PEDERSEN, H. E., and KEY, J. A. (1951), "Pathology of Calcareous Tendinitis and Subdeltoid Bursitis", *Arch. Surg. (Chicago)*, 62: 50.

PLENCK, H. P. (1952), "Calcifying Tendinitis of the Shoulder; A Critical Study of the Value of X-ray Therapy", *Radiology*, 59: 384.

QUIGLEY, T. B., and RENOLD, A. E. (1952), "Acute Calcific Tendinitis and 'Frozen Shoulder'; Their Treatment with A.C.T.H.", *New Engl. J. Med.*, 246: 1012.

SANDSTROM, C. (1952), "Calcification of the Intervertebral Discs and the Relationship between Various Types of Calcifications in the Soft Tissues of the Body", *Acta radiol. (Stockh.)*, 38: 217.

SCHWINGER, A. (1952), "Calcinosis Universales", *Radiology*, 59: 415.

WING, M. N. (1957), "Modern Thought on Lesions of the Shoulder Region", *MED. J. AUST.*, 2: 845.

THE PLACE OF LUMBAR DISCOGRAPHY IN THE ELUCIDATION OF LOW BACK PAIN WITH OR WITHOUT SCIATICA.

By A. I. RHYDDERCH,
Department of Orthopædics, Sydney Hospital, Sydney.

LOCAL INTEREST in lumbar discography was stimulated by the visit of Dr. Ralph Cloward. His technique, a refinement of that evolved earlier by the Swedish surgeons and radiologists, has been used throughout these investigations. Basically it consists of direct transdural puncture of the lumbar disc with a 26 gauge needle and the injection of radio-opaque dye. The alternative extradural approach advocated by P. R. Eriacher (1952) has not been attempted.

Discography has not been employed as a routine measure, but has been mainly confined to those cases of low back pain in which a lumbar disc derangement was held to be the cause of symptoms and additional evidence was needed to support the diagnosis. In any unequivocal prolapse of the disc with accurate localizing neurological signs of root pressure, discography is not warranted. In those cases in which subsequent excision of the disc was needed, the clinical findings were found to be highly reliable. In cases in which bilateral leg pain or cauda equina pressure is present, myelography is employed, as an intraspinal protrusion is suspected.

Discography can demonstrate the disintegration of the normal disc structure when the plain X-ray film and myelography show no abnormality, and thus help to pin-point the level of origin of the pain. These structural degenerative changes within the disc have been extensively studied by Harris and McNab (1954). The pathology of the causes of pain arising from the disc itself, or indirectly from resultant instability, overriding of the facets, osteo-arthritic changes in the post-synovial joints and diminution of the inter-vertebral notch, was graphically shown. These internal ruptures of the disc are well visualized.

During the course of these examinations, two basic facts were confirmed. The actual puncture of the normal disc is practically painless, and little dye can be introduced. The offending disc is far more sensitive and admits a larger quantity of dye. With further injection the patient's pain is reproduced — initially back pain, and with still further injection, radiation into the limbs. This pattern of pain reproduction is a very useful diagnostic aid.

In practice, discography has achieved the following objects: (i) enabled a confident diagnosis of internal disc rupture to be made; (ii) conversely, excluded disc abnormality at the lower lumbar levels as the cause of pain; (iii) in widespread disc degeneration, obvious on plain X-ray examination, facilitated localization by reproducing the pain.

The main drawback is that some hours after discography, the patient's pain is temporarily exacerbated, sometimes considerably. Occasionally it is technically difficult to enter a very narrow disc.

The following brief case reports and accompanying illustrations (Figures I to VII) may help to demonstrate the value of discography.

A patient had intermittent back pain, with radiation of pain to the anterior aspect of the thigh. There was occasional weakness of flexion of the hip, but no significant

loss of spinal movement. The discogram showed widespread disruption of disc structure between the third and fourth lumbar vertebræ (Figures I and II); structure was normal between the fourth and fifth lumbar vertebræ. Discography pinpointed the exact level of the disc lesion.

In the second case, low back pain followed a lifting injury at work. There were no localizing neurological signs. Rupture of the disc between the fourth and fifth lumbar vertebræ was found (Figures III and IV). The lumbo-sacral disc was normal. Excision of the ruptured disc abolished the back pain, persistent despite prolonged immobilization in a plaster of Paris jacket.

In the third case, there was low back pain with sciatic radiation, but no neurological signs or restriction of straight leg raising. Plain X-ray examination showed widespread disc degeneration (Figures V and VI). Injection into the disc between the fifth lumbar and first sacral vertebræ reproduced the patient's pain and pointed to this level as the site of pain. The disc between the fourth and fifth lumbar vertebræ was the seat of obvious degeneration. The corresponding interspinous ligament was not tender.

In the last case, there was severe crippling back pain with bilateral radiation to the limbs, marked loss of spinal movement and paresis of the foot and calf. The clinical findings were an indication for myelographic study rather than discography. Myelographic examination revealed complete spinal block between the fourth and fifth lumbar vertebræ (Figure VII). Operation disclosed a massive sequestrum of disc substance lying free within the spinal canal.

The purpose of presenting Figure VII is to show that myelography and discography are complementary examinations.

Acknowledgements.

I am indebted to Mr. A. Halm, of the Radiographic Department and Mr. R. Money, of the Photographic Department, Sydney Hospital, for their technical aid.

Reference.

Erlacher, P. R. (1952), "Nucleography", *J. Bone Jt Surg.*, 34B: 204.

Harris, R. I., and MacNab, I. (1954), "Structural Changes in the Lumbar Intervertebral Discs: Their Relationship to Low Back Pain and Sciatica", *J. Bone Jt Surg.*, 36B: 318.

Reviews.

Electrocardiography. By E. Grey Dimond, M.D.; Second Edition; 1958. Kansas: University of Kansas Medical Center. 11½" x 8½", pp. 174, with many illustrations. Price: $4.85.

At least six new books or new editions of books on electrocardiography are reviewed in these columns annually. Many are large and well-known reference manuals, some are in the form of an atlas, some are over-simplified. They all follow a common structure, and attempt to make the subject attractive to readers who have forgotten their physics. Certain rules and certain particular electrocardiographic patterns are arbitrarily offered for committal to a memory in which the owner is beginning to lose confidence.

It is refreshing and of great value, therefore, to encounter an essay which is logical, well presented, excellently illustrated and concise. The bio-electrical basis for the electrocardiographic tracing is explained in lucid, succinct paragraphs, with the aid of many small black and white line drawings, and with full-sized electrocardiograms; and if the reasons for each deflection in the cardiogram are understood, electrocardiographic interpretation, while still leaning heavily on experience, does not tax the memory and becomes a much more enjoyable and satisfying exercise. No words are wasted, and the author, Professor E. Grey Dimond, of the University of Kansas, states that this presentation has been evolved from a lecture syllabus for beginners, developed over six years with undergraduates or graduates. He has ambitiously attempted to carry his audience from a totally uninitiated stage to a fairly sophisticated level. He has eliminated all reference to history and to the various technical phases which have transpired in the story of modern electrocardiography, and has saved bulk and expense, by leaving out the bizarre and uncommon, as well as long legends in small type to his illustrations. There is very little reference to the arrhythmias, heart block, etc., and no practice cardiograms are given. In their place is sound, practical advice on how to interpret a tracing, how to set up an electrocardiographic service in hospital, and how to make teaching models to illustrate classical spatial relationships.

The first 60 pages are devoted to basic concepts essential to the understanding of clinical electrocardiography, in which the first sentences tell in simple words what a vector is. The vector approach is maintained throughout, although nothing is actually included on vectorcardiography itself. "Vector", "unipolar leads" and the "hexaxial reference system" are terms familiar to the reader from the beginning, while the *QRS* and *T* vectors in the frontal plane and then spatial orientation are not difficult for any reader to interpret when he has covered the 100 pages which make up the text and figures.

The author knows his subject so well, and is so conscious of the beginner's most frequent difficulties, that one has to seek with difficulty for small points to criticize. Not enough importance is ascribed to the appearance of the *U* wave in hypokalæmia; no help is given in the plight of the electrocardiographer trying to discern evidence of myocardial infarction in the presence of left bundle branch block; the word "strain" is retained, although it is not true that inverted *T* waves in left ventricular leads are usually reversed by ganglionic blockade. On page 77, we are told that atrial septal defects and anomalous pulmonary veins lead to right heart hypertrophy; over-activity would be more accurate; on page 105 the common misuse of the word "electrocardiograph" for "electrocardiogram" appears. But these are trivial faults, and the whole attitude of the author is most commendable. His refreshing invitation to search for infarction by unconventional leads and to place no emphasis on anatomical "patterns" of infarction, his clear guidance on such points as the difficult Q_3, the opposite effects of digitalis and hypokalæmia upon the *Q-T* interval, and the dangers of making vital decisions on cardiac competence on *T* wave changes alone, are all highly acceptable to us.

Professor Dimond has chosen an interesting technique with which to approach this subject, and has succeeded, with the aid of most excellent line drawings and photostats, in producing such a helpful and inexpensive aid to each teacher of this subject that he will want to possess his own copy, complete with its final glossary, which itself constitutes another textbook in miniature. Professor Dimond calls it a book of lectures for beginners; we call it first class revision for senior cardiographers as well.

The Guinea Pig in Research: Biology—Nutrition—Physiology. By Mary Elizabeth Reid, Ph.D.; 1958. Washington: Human Factors Research Bureau, Incorporated. 9" x 6", pp. 87, with seven halftone plates and 12 tables. Price: $2.00.

The guinea-pig (*Cavia porcellus* L.) occupies an important position in experimental studies in many fields of research. These animals have been used for animal experimentation since the nineteenth century; they are small and tame, easily handled and relatively simply housed. They are herbivorous and have been used widely and successfully for nutritional studies particularly of plant materials, as well as for studies on infectious diseases.

There are few books available which attempt to bring together relevant information regarding the guinea-pig's husbandry and its uses for experimental purposes. This book is of value, in that its object is to present the information in a readily available form to the research worker, but it has some deficiencies.

The first chapter deals with the genetics of the guinea-pig, and presents useful basic data with a table giving the recognized strains used in America. Average birth weights and litter sizes are given, together with variations which may be anticipated. The importance of recognizing the capacity of guinea-pigs for growth is stressed, and evidence is presented that data have been misinterpreted. Average weights for the various organs are also given.

The physiology of the guinea-pig is also dealt with, and pH values for the digestive organs are given, together with data on the movement of food through the digestive tract, average blood values at various ages and their ranges and blood pressure figures.

A large section of the book deals with the nutrition of the guinea-pig. It includes notes on different types of diet, and requirements for individual nutrients with special reference to minerals and vitamins. However, there are certain omissions, notably calcium-phosphorus imbalance and the need for stabilized ascorbic acid, which receives only passing reference. An account is given of the signifi-

cance of more recent nutritional developments. Various nutritional deficiencies are well illustrated.

The use of the guinea-pig in studies on infectious diseases is handled all too briefly and is inadequate. There is another section devoted to allergic and sensitization studies, and brief reference is made to pharmacological uses. Finally, the response of the guinea-pig to irradiation is given.

The material in the book is liberally supported by tables and graphs, and is accompanied by 227 references. Although by no means comprehensive, the book is of considerable value, particularly in the field of nutrition.

Essays on "The Welfare State". By Richard M. Titmuss; 1958. London: George Allen and Unwin, Limited. 8¼" × 5¼", pp. 232. Price: 20s. (English).

THE author of these essays is Professor of Social Administration in the University of London and is well known for his writings on social problems and issues. The ten essays in this volume deal with social administration and the changing society, the social division of welfare, pension systems and population change, war and social policy, the position of women, industrialization and the family, the hospital and its patients and the national health service in England; the last subject takes up three essays dealing respectively with some aspects of structure, some facts about general practice, and science and the sociology of medical care. A good deal in the book relates more particularly to the conditions and developments in the United Kingdom, and is to that extent limited in its interest; but the author has a good deal to say that is worth thinking about, whether or not one agrees with all his ideas in detail.

Pathophysiology in Surgery. By James D. Hardy, M.S., M.B., F.A.C.S.; 1958. Baltimore: The Williams and Wilkins Company. Sydney: Angus and Robertson, Limited. 10" × 6¾", pp. 724, with 278 illustrations. Price: £10 9s.

THIS work is a presentation of current information on the functional aspects of most of the problems encountered by the surgeon. The early chapters dealing with general propositions, such as the physiological changes following mechanical injury, alterations in body fluids and electrolytes (fluid balances and potassium retention amongst others) and tissue healing, are particularly useful, since these are not usually presented in such unified form.

The special sections deal with most systems of the body, particularly the various parts of the alimentary canal, the cardiovascular and respiratory systems, the endocrines and the central nervous system. There are also chapters on peculiarities in infancy and old age, on anæsthesia and on the impact of emotional states. The book is well documented with tables, graphs and diagrams, and there is a good index.

It is apparent that the interest is towards physiology rather than pathology, but the general approach is excellent. It is refreshing, these days, to see a work with a single author, though this has disadvantages; however, if one is not hypercritical, these are outweighed by the advantages of a thoroughly integrated text.

In this regard, it is important that all statements and opinions should not be taken as definitive. Some out-of-date, incomplete and, in certain cases, erroneous accounts (on the pathological side) appear; but it would be unreasonable to expect, in each field, the standard found when specialists deal with each field. With this reservation, this book can be recommended to the young surgeon and to those interested in recent advances in functional aspects of "surgical" conditions.

Clinical Proctology. By J. Peerman Nesselrod, B.S., M.S., M.Sc. (Med.), M.D., F.A.C.S., F.A.P.S.; Second Edition, 1957. Philadelphia and London: W. B. Saunders Company; Melbourne: W. Ramsay (Surgical) Limited. 9¾" × 6", pp. 318, with 72 illustrations. Price: 70s.

FOR proctologists this small book has much to offer. The subject is well covered (except that the rare basal cell carcinoma of the anus is omitted), the style is clear, and on the whole the illustrations are excellent. In a few of the photographs the rectal mucosa is rather pale. The author's personal views on the ætiology and treatment of ano-rectal diseases are described at length, and American thought is stressed. There is little discussion of opposing viewpoints, and few foreign references are given. Considerable emphasis is placed on the importance of the anal intramuscular glands in the pathogenesis of anal fistulæ and of other infections about the anus; but more detailed description of the management of complicated anal fistulæ could have been included with advantage. The inverted position of the patient is preferred for examination and for operation. One or two enemata are advised prior to the injection of hæmorrhoids. Ointments are favoured for the treatment of pruritus ani, and it is advised that a pelvi-rectal abscess should be drained through the levator ani muscle by Hilton's method. The difficulties associated with the treatment of a complete rectal prolapse and of recto-vaginal fistulæ are rather lightly passed off. However, the whole book contains many practical points and much that the author has learnt by experience. The production is of the usual high standard of W. B. Saunders Company, and the book may be recommended as a useful addition to medical libraries.

Woman's Change of Life. By Isabel Hutton, C.B.E., M.D.; 1958. London: William Heinemann (Medical Books) Limited. 7¾" × 4¾", pp. 124. Price: 6s. (English); second copy.

THIS small book is well arranged and clearly written, and deals sensibly with the menopause in all its aspects. It is written for middle-aged women, whether they need medical advice or not. It can be read with profit and comfort by all women of that age. The general practitioner or even the gynæcologist could profitably spend an evening perusing its pages.

Dr. Hutton explains clearly the nature of the menopause, and the various changes, both physical and mental, which take place. She gives sound counsel as to how a woman should plan her life during this period, and also explains when medical assistance should be sought. The pages dealing with diet, exercise and sex life during and after the menopause are particularly well written. Dr. Hutton mentions the varying needs and adjustments to be made by the housewife, the career woman and the woman of leisure.

This is a simple, interesting book which, if doctors recommend their patients to read it, will save many wearisome hours of explanation in the surgery.

Advances in Internal Medicine, Volume 9. Edited by William Dock, M.D., and I. Snapper, M.D.; 1958. Chicago: The Year Book Publishers, Incorporated. Melbourne: Ramsay's Medical Books. 8¾" × 5¾", pp. 400, with illustrations. Price: £4 13s. 6d.

THE aim of this particular annual series is not to present an over-all picture of advances in the whole of medicine each year, but to provide an up-to-date review of a few selected subjects. In this volume the subjects are the metabolism of vitamin B_{12} in pernicious and other megaloblastic anæmias, corticosteroids and infections, primary and secondary parathyroidism, hereditary defects in clotting mechanisms, the ætiology and pathogenesis of glomerulonephritis, the pathophysiology of carcinoid tumours, and some aspects of disordered renal tubular function. The authors of each section are men of standing in their own fields, and the reviews may be regarded as practical and authoritative.

Surgery for Students of Nursing. By John Cairney, D.Sc., M.D., F.R.A.C.S., with a foreword by Miss M. I. Lamble, C.B.E.; Third Edition; 1958. New Zealand: N. M. Peryer, Limited. 8¾" × 5¼", pp. 359. Price: 40s. (New Zealand).

THE publication of three editions of this book since 1952 indicates its popularity in New Zealand as a text on the fundamentals of surgery for nurses. Within its pages an attempt is made to give an outline both of surgery as a whole and of surgical nursing; but there are many omissions, including neurosurgery, cardiac surgery and cardiac arrest, adrenalectomy, laryngectomy, ileostomy and the operating theatre. Some subjects, such as errors of refraction, could have been omitted in their favour, and a few of the illustrations, such as Figure 10 (thenar and palmar space infections) are larger than necessary. In the review of the first edition, the inclusion of the "nearly obsolete Pilcher's bag, the Stamm type of gastrostomy, and the rubber dam and gauze packing for the perineal wound after excision of the rectum" was criticized. Six years later they still appear. On the other hand, there would, as was previously remarked, seem to be a need for illustrations of the apparatuses for blood transfusion, gastric aspiration, tidal drainage, etc., in books on surgical nursing. The inclusion of a chapter on anæsthesia is to be commended, but perhaps some mention should be made of the antagonists to the barbiturates and

to morphine. One may question the placing of the chapter on the large intestine before that on the stomach, and the use of a lower case "n" in the abbreviation of "normal saline". Also, some indication of their magnification would be better included with the diagrams of bacteria. In general, however, this book is well set out, and it will certainly repay careful study by student nurses.

Insulin Crystals: Chemical and Biological Studies on Insulin Crystals and Insulin Zinc Suspensions. By Jørgen Schlichtkrull; 1958. Copenhagen: Ejnar Munksgaard Publishers. 9¾" x 6¾".

This book is a description of chemical and biological studies on insulin crystals and insulin zinc suspensions. The author is attached to Novo Terapeutisk Laboratorium in Copenhagen, where the experimental work was carried out.

The first half of the book gives a very detailed account of the production of crystalline insulin and the physical properties of these crystals. There is also a detailed study of insulin-zinc compounds. This part is highly technical and would be of interest to few medical men.

The second half of the book deals with biological investigations with various types of crystalline insulin, insulin-zinc compounds and mixtures of these. The main part of the investigations deals with the production of insulin preparations which will have a prolonged effect—24 hours or more—in the body after injection. There is a great deal of very interesting material in this section on the various factors which can influence the activity of insulin in the body.

The book is a highly specialized account of observations on insulin and modified insulins, but there is little clinical detail. A diabetic specialist would no doubt find much to interest him in the book, but for the general reader the field is restricted.

Practical Clinical Biochemistry. By Harold Varley, M.Sc., F.R.I.C.; Second Edition; 1958. London: William Heinemann (Medical Books), Limited. 8½" x 5½", pp. 643, with many illustrations. Price: 42s. (English).

The second edition of this useful book follows the general lines of the first. The working details of each estimation or reaction (or related group of estimations) are followed by a brief discussion of clinical findings, and a list of references. A choice of methods is often given. This sometimes includes methods which are now obsolete. With regard to tests as distinct from methods, there is, of course, justifiable difference of opinion on the most useful selection.

Although the size of the book has been only slightly increased, much new material has been added. There is now a section on paper chromatography with special reference to the differentiation of reducing substances in the urine. An extended section on paper electrophoresis has been introduced. Many additional methods for determination of steroid hormones have been added, and a section on pressor amines has been included. In the section on enzymes, methods for the determination of transaminases have been introduced. Unfortunately, the recent simplified methods of Reitman and Frankel have only been mentioned without reference, but not described.

Varley's excellent book is essential in any laboratory where clinical biochemical tests are performed.

Books Received.

"Medical Department, United States Army: Surgery in World War II: Neurosurgery", Volume 1; Prepared and published under the direction of Major General S. B. Hays; Editor-in-Chief, Colonel John Boyd Coates, Jr., M.C., Washington, D.C.: Office of the Surgeon General, Department of the Army. 9¾" x 6¼", pp. 488, with 130 illustrations and charts combined, 19 tables. Price: $5.00.

The first of two volumes on neurosurgery in World War II and part of the official history of the Medical Department, U.S. Army.

"Antibiotics Annual, 1958-1959", edited by Henry Welch, Ph.D., and Felix Martí-Ibáñez, M.D.; 1959. New York: Medical Encyclopedia, Incorporated. 10" x 6", pp. 1128, with many illustrations and tables. Price: $12.00.

The proceedings of the sixth annual Symposium on Antibiotics held in October, 1958.

"The Differential Diagnosis of Abdominal Pain", edited by Sherman M. Mellinkoff, M.D.; 1959. New York, Toronto and London: McGraw-Hill Book Company, Limited. 8" x 5", pp. 458, with 28 illustrations. Price: $9.00.

A symposium originally presented by the Division of Post-Graduate Medical Education, University of California Medical Center, Los Angeles.

"Nurse-Patient Relationships in Psychiatry", by Helena Willis Render, R.N., B.S., and M. Olga Weiss, R.N., M.Litt.; Second edition; 1959. New York, Toronto and London: McGraw-Hill Book Company, Incorporated. 8½" x 5¾", pp. 330. Price $5.95.

The authors have aimed to bring up to date the approach used in the first edition of 1947.

"A Textbook of Neurology", by H. Houston Merritt, M.D.; Second edition; 1959. Philadelphia: Lea & Febiger. Sydney: Angus & Robertson, Limited. 9¼" x 5¾", pp. 768, with 182 illustrations, and 123 tables. Price: £6 17s. 6d.

This book has been fully revised in the four years since the publication of the first edition.

"Atomic Medicine", edited by Charles F. Behrens, M.D., F.A.C.R.; Third edition; 1959. Baltimore: The Williams and Wilkins Company. 9" x 6", pp. 720, with many illustrations. Price: £8 5s.

The first edition appeared in 1949 and the second in 1953.

"British Obstetric and Gynæcological Practice", edited by Sir Eardley Holland, M.D. (Lond.), F.R.C.P., F.R.C.S., F.R.C.O.G., and Aleck Bourne, M.A., M.B., B.Ch. (Cantab.), F.R.C.S., F.R.C.O.G.; "Obstetrics", edited by Sir Eardley Holland. Second Edition; 1959. London: William Heinemann, Medical Books, Limited. 9¼" x 7", pp. 1242, with many illustrations and 24 tables. Price: 147s. (English).

This volume deals with obstetrics. A separate volume deals with gynæcology.

"First Studies in Anatomy and Physiology", by John Cairney, D.Sc., M.D., F.R.A.C.S., and John Cairney, B.Sc., M.B., Ch.B. Second edition; 1959. Christchurch: N. M. Peryer Limited. 7¼" x 4¼", pp. 236, with 105 illustrations. Price: 30s. (New Zealand).

An elementary text-book suitable for nurses in preliminary training schools and others. The first edition was published in 1956.

"International Textbook of Allergy", edited by J. M. Jamar, M.D. First edition; 1959. Oxford: Blackwell Scientific Publications. 10¼" x 7", pp. 639, with illustrations. Price: £5 10s. (English).

A composite text-book prepared by those concerned in the various differing fields of allergy.

"Critique of Religion and Philosophy", by W. Kaufmann. First edition; 1959. London: Faber and Faber. 9¼" x 6¼", pp. 342. Price: 25s. (English).

The author is Associate Professor of Philosophy at Princeton University.

"Abnormal Hæmoglobins", A Symposium organized by The Council for International Organizations of Medical Sciences, edited by J. H. P. Jonxis and J. F. Delafresnaye, C.I.O.M.S. Paris; 1959. Oxford: Blackwell Scientific Publications. 8¾" x 5½", pp. 440, with many illustrations. Price: 45s. (English).

A comprehensive account of current knowledge.

"Orthopædic Surgery", by Sir Walter Mercer, M.B., Ch.B. (Edin.), M.Ch.Orth. (Liv.) (Hon.), F.R.C.S. (Edin), F.A.C.S. (Hon.), F.R.C.S. (Eng.), (Hon.), F.C.S.S.Af. (Hon.), F.R.C.S.E. (Hon.), F.R.S. (Edin.); Fifth edition; 1959. London: Edward Arnold (Publishers) Limited. 9" x 5¾", pp. 1076, with 422 illustrations. Price: 90s. (English).

Extensively revised since the fourth edition of 1950.

"A Textbook of Bacteriology", by R. W. Fairbrother, T.D., M.D., D.Sc. (Man.), F.R.C.P. (Lond.). Eighth edition; 1959. London: William Heinemann, Medical Books, Limited. 8½" x 5½", pp. 510, with many illustrations. Price: 25s. (English).

A text-book for students extensively revised since the last edition of 1953.

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WOUND HEALING.

WOUNDS, whether inflicted accidentally or by the surgeon, heal so frequently that many who are responsible for their care are apt to take for granted the wonderful processes of wound healing. Ambroise Paré was sufficiently truthful and modest to admit that God healed the wound, the surgeon's duty being to dress it. During the past thirty years or so, many research workers primarily interested in clinical problems have been turning to the basic sciences for methods of study, and several studies on the biochemical and histological aspects of wound healing have recently appeared in the medical Press. A review of these at this stage should be of general interest.

The epidermis is capable of rapid and complete regeneration. The cells which accomplish this come from the edges of the wound and from the epidermal appendages such as hair follicles or sweat glands. W. S. Bullough and E. B. Laurence[1] believed that the enormous increase in mitotic figures seen within a millimetre or two of the edge of the wound represented an exaggeration of the normal mitotic activity and not a qualitative alteration of cellular metabolism. This mitotic activity is apparently aerobic, for it can be inhibited by enzyme poisons which inhibit respiration (W. W. Washburn[2] and P. B. Medawar[3]). At about the same time as the mitotic activity increases, the cells at the edges of the wound begin to migrate across the new surface. L. Loeb[4] showed nearly forty years ago that the rate of migration was roughly proportional to the number of mitoses found in the resting epidermis. T. Gillman and J. Penn[5] have suggested that the epidermal changes have a dominating influence on the changes in connective tissue beneath. As maturation of the two tissues continues during and after healing, epidermal penetration of the granulation tissues occurs, and a realignment of the epidermis occurs *pari passu* with new collagen formation. One of the mysteries of nature which is a long way from being solved is this influence of one cell on another. The way in which one cell or group of cells influences another cell or group of cells is presumably brought about by cellular hormones, possibly nucleoproteins, but their precise nature and how they work remain a mystery.

During the second day after the infliction of a wound, fibroblasts in the dermis begin to appear and rapidly proliferate. Not long after their appearance the earliest signs of collagen deposition occur. However, before collagenous fibres are visible histologically the amorphous ground substance adjacent to the wound has the staining properties of acid mucopolysaccharide (J. E. Dunphy and K. N. Udupa[1]). This toluidine blue metachromasia reaches its peak in five or six days, and then rapidly declines (M. L. Stearnes,[2] S. B. Wolbach,[3] E. Kodicek[4] and Kodicek and G. Loewi[5]). It has been suggested that the mucopolysaccharide in the ground substance is responsible for the precipitation of collagen rods which are secreted in a soluble form from the fibroblasts (Stearnes[2]). Rudolph Virchow[6] was the first to suggest that collagen was secreted as a soluble substance and took on the characteristic fibrillation appearance outside the cell. The mucopolysaccharide concentration decreases as collagen formation increases. Dunphy and Udupa[1] suggest two phases of wound healing: first, the acquisition of the building blocks (mucopolysaccharides), and second, the collagen phase, which continues until the healing and contracture are complete. Protein-starved animals are unable to accumulate mucopolysaccharides as rapidly as normal, but the delay may be partially reversed if these protein-depleted animals are fed methionine. J. F. Morgan and H. J. Morton[7] showed that the activity of fibroblasts was related to the sulphur-containing amino acids, such as methionine. They pointed out that the intact animal probably converted methionine to cystine and that this conversion was accompanied by fibroblastic growth. According to M. B. Williamson, T. A. McCarthy and H. J. Fromm,[8] there is a direct correlation between increasing tensile strength of a wound and the sulphur content of the granulation tissue.

B. L. Reynolds, J. B. Codington and R. W. Buxton[9] have investigated the effect of the addition of a co-enzyme, adenosine-5-monophosphate (A5MP), on the biochemical aspects of wound healing. They found that the delay in wound healing which usually follows protein starvation or steroid administration could be diminished by A5MP. In other words, the collagen production is assisted by the A5MP, this effect probably being brought about by cellular energy reactions and synthesis. As a result of their work they postulate that adenosine-5-monophosphate may effectively reduce the lag period between the infliction of a wound and the commencement of healing. J. F. Prudden, G. Nishihara and L. Baker[10] have shown in experimental wounds in the rat that the tensile strength of the wound in the early

[1] *Brit. J. exp. Path.*, 1957, 38: 273.
[2] *J. invest. Derm.*, 1954, 23: 97.
[3] *Quart. J. micr. Sci.*, 1947, 88: 27.
[4] *J. med. Res.*, 1920, 41: 247.
[5] *Med. Proc.*, 1956, 2: 121.

[1] *New Engl. J. Med.*, 1955, 253: 847.
[2] *Amer. J. Anat.*, 1940, 67: 55.
[3] *Proc. Nutr. Soc.*, 1953, 12: 247.
[4] "Fifth Congress of the International Society of Orthopædic Surgery and Traumatology": 424.
[5] *Proc. roy. Soc. B.*, 1955, 144: 100.
[6] *"Die Cellularpathologie in ihrer Begrundung auf physiologische und pathologische Gewebelehre"*, 1871, A. Hirschwald, Berlin: 40.
[7] *Fed. Proc.*, 1955, 14: 257.
[8] *Proc. Soc. exp. Biol. (N.Y.)*, 77: 302.
[9] *Surgery*, 1958, 44: 33.
[10] *Surg. Gynec. Obstet.*, 1957, 105: 283.

stages of healing may be increased by 20% if the wound is treated with powdered bovine cartilage. There appears to be some connexion between Prudden, Nishihara and Baker's work and the importance of the mucopolysaccharides cited above, because cartilage is a good source of these building blocks. The tensile strength of healing wounds is very largely dependent on the adequacy of the returning collagen. The studies cited indicate some of the mechanisms involved in collagen production. Irritation in the substance of a wound, especially if giant-cell reaction is produced, delays fibroplasia and collagen-fibre formation (J. A. Schilling, B. V. Favata and M. Radakovich,[1] and Hans Selye[2]). The effects of wound sepsis and retained foreign body on wound healing have been observed clinically for a long time. Catgut produces such a reaction, and it has been suggested that the ideal suture material would be non-absorbable inert thread.

The healing of most wounds is accompanied by a greater or lesser degree of contracture. H. Grillo, G. Watts and J. Gross[3] have studied the biochemistry and anatomy of contracture in wounds. These investigators attempted to relate the collagen (hydroxyproline), glucoprotein, mucopolysaccharide, tryosine (non-collagenous protein), water and total tissue weight to the contraction of healing wounds in guinea-pigs. Although they showed a rapid increase in the total wound content in the first five to eight days after wounding and an equally rapid fall after about the tenth day, the rate of contracture continued at an even pace throughout. Consequently, there did not seem to be any relationship between these substances in the wound and the occurrence of contracture. Contracture of the scab may well be due to dehydration, but the water content of the wound itself was found to be independent of the contracture. These workers found in their dissections that the advancing skin edge was always firmly attached to a rim of newly formed tissues; if the edge became detached, retraction occurred. This finding stimulated the same team, G. Watts, H. Grillo and J. Gross,[4] to investigate the growing edge. They postulated a "mass migration" of a highly cellular matrix containing many fibroblasts deep to the healing edge, which draws the two sides of the wound together. However, the contracture is not a simple process; after the epithelium has closed the gap, it continues by shrinkage of collagen.

The processes of wound healing may be upset by a variety of local and general influences, including tension, apposition, paraplegia, resuture and nutritional deficiency. It has long been taught that the healing processes are hampered if tissues are repaired under tension. S. Borgstrom and P. Sandblom[5] showed that skin wounds healing under tension were weaker at five days than in the control rabbits. On the other hand, in rats, a wound of the abdominal wall had greater tensile strength if the animals were exercised. M. L. Mason and H. S. Allen,[6] investigating the healing of tendons, found that although neater healing occurred with full immobilization, the tensile strength of the united tendon was greater if motion was begun 21 days after suture. These authors believe that the tension increased the strength of the suture after the exudative phase of repair was completed. B. F. Lounsbury[7] found that the tensile strength of a healed tendon was less if the muscle attached to that tendon was denervated. The steady pull of the normal muscle on the tendon suture increases the tensile strength of the healed tendon. R. C. Buck[8] showed that the effect of the pull was to produce an orientation of the cells along the axis of the traction. S. Thorngate and D. J. Ferguson[9] investigated the effect of tension on the healing of aponeurotic lesions. If the wound healed under tension, then the tensile strength was greater than if no tension was applied. The effect of the tension began on the seventh day and reached a plateau by three weeks. If tension was applied seven days after injury, then the effect was the same as if it had been applied from the beginning. The next factor is apposition. Needless to say, if tension is so great as to separate the wound edges, the tissues will take longer to heal. Highly specialized tissues are capable of regenerating if the component parts are very accurately apposed. D. S. Jones[4] has investigated the repair of skeletal muscle in the dog. The union is first accomplished by fibrous tissue; then, after about three months, muscle fibre regeneration virtually eliminates the scar. However, the accuracy of apposition required to produce this muscle regeneration is not often found clinically. The same meticulous apposition of divided nerves has been the main tenet of nerve suture for many years. On the question of paraplegia, S. A. Loculio, E. W. Lowman and J. Gibson[5] have found, contrary to expectations, that the paraplegic patient can heal a wound as well as a normal patient. The failure to heal of decubitus ulcers is due to repeated trauma to anæsthetized skin, not to failure of healing powers. Lesions on the feet in long-standing diabetes with gross neuropathy have the same difficulty, with the added disturbed metabolism, although the latter may be much less important than we used to think. Investigating the effect of resuture, E. D. Savlov and J. E. Dunphy[6] and T. W. Botsford[7] have shown that the normal lag period which follows an injury before healing commences does not occur if a wound disrupts and has to be resutured. The last of these factors is nutritional deficiency. M. W. Kobak, E. P. Benditt, R. W. Wissler and C. H. Steffee[8] have demonstrated that protein deficiency interferes with wound healing, and, as we have seen, the sulphur-containing amino acids have a rôle in some stages of healing (S. A. Localio, M. E. Morgan and J. W. Hinton[9]). R. Sisson, S. Lang, K. Serkes and M. D. Pareira[10] have tested the tensile strength of wounds in rats in various stages of acute and chronic

[1] *Surg. Gynec. Obstet.*, 1953, 96: 143.
[2] In "Symposium on the Mechanism of Inflammation", 19th International Physiological Congress, edited by G. Jasmin and A. Robert, 1953, Acta, Montreal: 53.
[3] *Ann. Surg.*, 1958, 148: 145.
[4] *Ann. Surg.*, 1958, 148: 153.
[5] *Ann. Surg.*, 1956, 144: 982.
[6] *Ann. Surg.*, 1941, 113: 424.

[1] *Bull. Northwestern Univ. med. Sch.*, 1951, 25: 47.
[2] *J. Path. Bact.*, 1953, 66: 1.
[3] *Surgery*, 1958, 44: 619.
[4] In "Healing of Wounds", edited by M. B. Williamson, McGraw, New York: 149.
[5] *Surgery*, 1958, 44: 625.
[6] *Surgery*, 1954, 36: 362.
[7] *Surg. Gynec. Obstet.*, 1941, 72: 690.
[8] *Surg. Gynec. Obstet.*, 1947, 85: 751.
[9] *Surg. Gynec. Obstet.*, 1948, 86: 582.
[10] *Surgery*, 1958, 44: 613.

malnutrition and found that the tensile strength decreased with the body weight. Resuture of deliberately disrupted wounds under protein deprivation shows that there is no lag period in healing at second suture.

The studies reported above show only a tiny fraction of the immensely complicated biochemical machinery which comes into action when a finger is pricked or a child scratches his knee. In the future such work may enable the surgeon to control the healing of a wound and the amount of scar tissue which results. Further, if the way in which one collection of growing cells "talks" to its neighbours could be understood, then some of the crucial problems of neoplasia would be well on the way to solution. The neoplastic cell is deaf to the "talk" of his neighbours which should restrain unruly multiplication. L. C. Edwards and J. E. Dunphy[1,2] recently published a review of the present knowledge available on wound healing. Their papers are well worth careful study to anyone interested in this problem, and will indicate something of the extent of a major field of surgical research. These are certainly exciting times for the surgeon. We in Australia should see to it that our young men with ideas are encouraged to study these fascinating problems.

Current Comment.

ADOLESCENT MEDICINE.

Interest in adolescent medicine is growing, and many writers feel that work with adolescent patients offers unusual opportunities for total medical care. J. A. H. Lee[3] observes that "surveys have shown that this is an age group in which there may be a failure of medical care", and the British Pædiatric Association[4] has recently published a report which urges closer collaboration between those concerned with young people, and the development of out-patient adolescent clinics and small adolescent wards. Such a ward has been established in Sheffield, England, and out-patient facilities now exist in at least nine major cities in the United States. Douglas Hubble[5] suggests that the family doctor is well placed to proffer the youngster "the detached but imaginative understanding which his situation so often requires". Arthur Roth,[6] reporting on the Teenage Clinic at the Kaiser Foundation Medical Centre at Oakland, California, expresses the view that his patients have appreciated the opportunity to talk to their own doctor, and states that physicians can do much to clarify many popular misconceptions about teenagers, particularly that which considers the word "adolescent" synonymous with "delinquent".

Most authorities agree that children and young people particularly reflect the tensions of our age; the report of the World Federation for Mental Health on this question, "Growing Up in a Changing World", was noticed in these columns recently.[7] Among recent Australian papers on delinquency and children's emotional problems, in one Alan Jennings[8] discusses the contribution that might be made by the pædiatrician and the general practitioner, in another psychosomatic disorders in childhood are examined by L. W. Batten[9] and by John Apley,[10] and in a third A. White Franklin[1] contributes a stimulating paper on iatrogenic disease in childhood. Certainly the physician dealing with adolescents needs a clear understanding of such mind-body relationships as these authors describe, and in this regard attention is drawn to "Emotional Problems of Adolescents", an excellent survey by J. Roswell Gallagher, the physician in charge of the Adolescent Unit in Boston, Massachusetts, prepared in collaboration with Herbert Harris,[2] a psychoanalyst; this is designed to acquaint physicians and lay workers with the part they may play in handling such problems.

Many adolescents are naturally engaged in school or university studies, and physicians are often consulted by parents or teachers about a child's difficulties in school. These may be simple to elucidate and easily rectified, but occasionally such a problem is part of a much more severe disturbance, and the entity known as "school phobia" should be recognized early for the best therapeutic prognosis. The children concerned may present a multitude of somatic symptoms and an irrational unwillingness to go to school. Kurt Glaser[3] points out that treatment involves manipulation of the environment to return the child to school, with attention to the underlying neurotic disturbance of the mother or child or both. Difficulties with basic skills in reading are another source of trouble in school, and Elizabeth A. Kemp[4] gives an account of this problem. University health services have made great progress in recent years, and the appointment of Dr. Nicolas Malleson to the University of Sydney Student Health Service draws attention to this writer's lucid and practical approach to this type of medical practice. His experience at University College, London, described in "The Matrix of Medicine",[5] provides a remarkable parallel to the series of cases discussed in the article by Murray Williams published in this issue (see page 201). Malleson notes that "it is the adjustment problems, serious or mild, that are the particular headache of university practice. Not only are they numerically the greatest, but their management, as a rule, falls to the physician himself". He finds that the chief role of university physicians "is in giving help, support and advice to students as they adapt themselves to the physical and mental changes of growing up, and to the requirements of intensive study", and he considers that dealing thus with failures of adjustment or adaptation is a clear example of the ecological concept in medicine. This idea is stated in different terms by Dana L. Farnsworth,[6] director of the Health Service at Harvard University, who notes that "attention to social factors conducive to illness may produce more effective results in the long run than too exclusive an emphasis on the treating of the sick". This redirection of emphasis seems not only characteristic of adolescent medicine but inherent in the whole philosophy of modern medical practice.

A NEW TEST FOR RHEUMATOID ARTHRITIS.

Recent advances in our understanding of the various forms of joint arthropathy have made laboratory aids in the diagnosis of these conditions increasingly important. The presence of an unusual serum protein in rheumatoid arthritis is now well known, and is the basis for several laboratory tests. However, all previous tests present technical difficulties, so reports on the recently introduced bentonite flocculation test are of considerable interest. This test is a modification of a serological test used to detect Trichinella antibodies, and was originally proposed by J. Bozicevich, J. J. Bunim and others in 1957. In a recent paper by K. J. Bloch and J. J. Bunim[7] this test is fully described; it is stated that the test is simple to perform and can be completed in one hour, and the results given suggest that it is sensitive and reliable.

[1] *New Engl. J. Med.*, 1958, 259: 225.
[2] *New Engl. J. Med.*, 1958, 259: 275.
[3] *Brit. med. J.*, 1958, 1: 573 (March 8).
[4] *Lancet*, 1959, 1: 825 (April 18).
[5] *Brit. med. J.*, 1958, 1: 191 (January 25).
[6] *Gen. Practit. Aust.*, 1959, June: 162.
[7] Med. J. Aust., 1959, 1: 333 (March 7).
[8] *Ibid.*, 1959, 1: 146 (January 31).
[9] *Brit. med. J.*, 1959, 1: 1109 (April 25).
[10] *Lancet*, 1959, 1: 641 (March 28).

[1] *Brit. med. J.*, 1958, 2: 559 (September 7).
[2] "Emotional Problems of Adolescents", 1958, Oxford.
[3] *Pædiatrics*, 1959, 23: 371.
[4] Med. J. Aust., 1957, 2: 678 (November 9).
[5] "The Matrix of Medicine", 1958, Pitman, London.
[6] *J. School Health*, 1954, 24: 289 (December).
[7] *J. Amer. med. Ass.*, 1959, 169: 307 (January 24).

Abstracts from Medical Literature.

MEDICINE.

Constrictive Pericarditis.

T. M. D. GIMLETTE (*Brit. Heart J.*, January, 1959) reviews the case reports of 62 patients with constrictive pericarditis. In 28 of these constriction appeared within one year of an attack of pericarditis. In 15 of these 28 cases of acute constriction, bacteriological or histological evidence of tuberculosis was found. In contrast, such evidence was available in only two out of the 34 patients who developed constriction more insidiously. In 11 patients a non-tuberculous ætiology was suggested, such as secondary carcinomatosis of the pericardium, irradiation of the mediastinum, or suppurative pericarditis. The author also mentions five cases associated with rheumatoid arthritis and states that in this group there was probably more myocardial involvement than usual. Reviewing the signs, the author confirms that a raised venous pressure was present in all cases. A triple heart rhythm due to the addition of an early diastolic sound was found in over two-thirds of the cases and tended to persist after pericardiectomy. As far as X-ray changes were concerned, cardiac enlargement was by no means rare; calcification was demonstrated in 42% of patients. The electrocardiogram showed atrial fibrillation in one-third of all cases, and on the whole this was an unfavourable prognostic sign. The results of surgery were much better in the group with acute constriction; chronicity, myocardial involvement and cardiac enlargement were usually associated with poor surgical results.

Post-Partum Heart Disease.

A. B. BENCHIMOL, R. D. CARNEIRO AND P. SCHLESINGER (*Brit. Heart J.*, January, 1959) discuss the subject of post-partum heart disease. The authors, who have seen 18 cases, state that the initial signs of heart failure often appear during the last weeks of pregnancy, sometimes to disappear after delivery and then to return in a much more severe form. This syndrome appears to be the result of multiple factors leading to heart failure rather than a specific disease. The most important predisposing factors are toxæmia of pregnancy, hypertensive heart disease and myocarditis, either specific or non-specific. The clinical course and prognosis depend to a large extent on the underlying mechanism.

The Myocardial Factor in Mitral Valve Disease.

H. A. FLEMING AND P. WOOD (*Brit. Heart J.*, January, 1959) draw attention to a comparatively small group of patients with mitral valve disease in whom the symptoms and signs are not due to tight mitral stenosis but rather due to myocardial dysfunction. The clinical picture is characterized by a long history of fatigue, recurrent heart failure, systemic embolism and atrial fibrillation, associated with signs of mild mitral stenosis. The chief physiological findings are a low cardiac output with relatively normal left atrial pressure and only slightly raised pulmonary vascular resistance. The authors stress that in this syndrome mitral valvotomy does not improve cardiac function or prevent embolism.

Paroxysmal Ventricular Tachycardia.

G. R. HERRMANN, H. M. PARK AND M. R. HEJTMANCIK (*Amer. Heart J.*, February, 1959) review 84 episodes of paroxysmal ventricular tachycardia. Clinical and electrocardiographic features are described in detail. Some form of heart disease, usually ischæmic, was present in nearly 90% of all cases. Six patients with apparently normal hearts and paroxysmal ventricular tachycardia are described and the role of anxiety, apprehension, emotional stress and hypokalæmia is emphasized. Digitalis intoxication was definite in 10% and probable in 17%; 42% of all patients had had no digitalis. In patients with myocardial infarction the prognosis is very poor even after the paroxysmal ventricular tachycardia has been promptly stopped by treatment. In any case, paroxysmal ventricular tachycardia adds to the seriousness of the outlook.

Pulseless Disease.

S. S. MISRA, S. PRAKASH AND P. L. AGRAWAL (*Amer. Heart J.*, February, 1959) describe three cases of pulseless disease (Takayashu's syndrome). Two of the patients presented an associated nephrotic syndrome due to amyloidosis, a combination not previously reported. Literature and clinical features are fully reviewed.

Bronchial Cytology.

G. KAHLAU (*Germ. med. Monthly*, February, 1959) summarizes the cytological examination of some 6933 specimens of sputum and 498 of bronchial secretions. There were 547 confirmed cases of bronchial carcinoma. A cytological diagnosis was made in 57·6% of these; cells probably malignant were reported in 10%, in 14·7% a doubtful result was reported, and in 17·7% a negative result. Among 83 control cases of non-malignant lung disease false-positive reports of malignant cells were made in 11 and reports of probably malignant cells in 12. The cause of these false-positive results was the metaplasia of the bronchial epithelium which is common in lung disease and not, according to the author, to any technical shortcomings of the method.

The Role of Anticoagulation Therapy in Acute Myocardial Infarction.

F. J. CONRAD AND N. O. ROTHERMICH (*A.M.A. Arch. intern. Med.*, March, 1959) present a clinico-pathological study of acute myocardial infarction and the role of anticoagulation therapy. Most clinical studies have reported a definite decrease in both morbidity and mortality in patients receiving anticoagulants as compared with control groups, but there remains a conflict in the literature as to which patients should or should not be treated with anticoagulants. This study covered a series of 623 patients with acute myocardial infarction seen over a period of 16 years. Some of these received adequate anticoagulation therapy, some received inadequate anticoagulation therapy, and some did not receive any anticoagulation therapy. The conclusions reached were that patients not receiving anticoagulation therapy have a morbidity and mortality three times that of a comparable group of patients receiving therapy; and that anticoagulants are effective and should be used in both good-risk and poor-risk patients. Anticoagulants should be started as soon as possible after the onset of acute myocardial infarction.

Whipple's Disease.

L. I. TAFT, A. G. LIDDELOW AND M. RALSTON (*Aust. Ann. Med.*, May, 1959) report a clinico-pathological study of three cases of Whipple's disease. They state that about 60 cases of this condition have been described. The ætiology, pathogenesis and treatment are unknown, though numerous theories have been put forward. The authors consider that mechanical lymphatic obstruction is a reasonable explanation for the appearances in the lymph nodes and lymphatics of their patients, and suggest that proliferation of the mucoprotein-containing foamy cells is the fundamental defect in Whipple's disease, leading to obstruction in the lymphatic system. This obstructive process is concentrated in the lymphatic system of the small intestine, but occurs at other sites. Transitions between RNA-containing cells and cells containing mucoprotein are considered to indicate synthesis of the mucoproteins, rather than phagocytosis. It is suggested that the proliferation of the mucoprotein-synthesizing cells may represent a highly-differentiated neoplastic process, or may be the outcome of some enzymatic defect. The authors state that the response to steroid therapy observed in this condition is compatible with the known reticulo-endothelial suppressive action of adrenal cortical steroids, but that this response is not sustained.

Treatment of Acute Renal Failure.

E. J. SCHULZ AND F. D. MURPHY (*A.M.A. Arch. intern. Med.*, March, 1959) discuss the treatment of acute renal failure, and base their remarks upon a study of 81 patients with this condition. They state that the prognosis is poor and is dependent to a great degree upon the nature and severity of the precipitating injury or illness, as well as the extent of the renal lesion. Shock, either surgical, traumatic or hæmorrhagic, was the cause of failure in 21 of these patients. Incompatible blood transfusion was the second most important causative agent. Whatever the source, renal failure is more apt to occur in patients from 30 to 70 years of age. The mortality may be reduced if the patient is closely managed by a regimen which (i) rigidly restricts fluid and electrolyte intake, (ii) controls protein catabolism, (iii) minimizes serum potassium rise, and (iv) supports the cardio-vascular system. The oliguric-anuric phase is the most critical, and fluid balance presents a problem. Usually 600 ml. of water may safely be supplied daily, depending upon the degree of variation of the patient from the basal state. An equal amount of

water is then added to replace urine output and other overt loss. The weight of the patient should be closely watched and determined daily by the use of a bed scale. By using a 10% sugar solution (glucose or fructose), to which is added 95% ethyl alcohol (up to 100 ml. daily), the basic carbohydrate calorie requirements can be supplied. All fluids and foods are given parenterally in order to obtain an accurate measure. An indwelling catheter should be avoided if possible. However, if the patient does not void every 24 hours catheterization may be performed, with very careful technique. Potassium-containing substances should not be given at any time during the oliguric-anuric stage, and 20 to 30 units of regular insulin may be administered simultaneously with the carbohydrate as a temporary measure to decrease the serum potassium. Dialysis with the artificial kidney is a valuable therapeutic agent and has been responsible for decreasing the mortality. Indications for its use are discussed. The contra-indications to dialysis are active bleeding from any source, or prolonged hypotension just prior to dialysis. Of the 81 patients in this series, 62 were treated conservatively and in 19 patients dialysis was employed. Pulmonary œdema was the most frequent cause of death.

Effect of the Cardiac Arrhythmias on the Coronary Circulation.

E. CORDAY *et alii* (*Ann. intern. Med.*, March, 1959) discuss their observations upon the effect of the cardiac arrhythmias on the coronary circulation. Comparative measurements of coronary artery and sinus flow, coronary blood pressure and systemic blood pressure, cardiac output and venous pressure were made on animals during regular sinus rhythm, premature auricular and ventricular systoles, auricular tachycardia, flutter and fibrillation, and during ventricular tachycardia and fibrillation. Coronary artery flow was often reduced by these arrhythmias. Coronary sinus flow was also reduced, but not to the same degree. Transient compensatory mechanisms attempt to maintain myocardial blood supply in rapid tachycardias, if the systemic blood pressure and cardiac output are not too seriously compromised. Brachial artery tracings in human patients revealed a significant lowering of systemic blood pressure, similar to those of the experimental animal, following premature auricular and ventricular systoles, and during auricular fibrillation, flutter and tachycardia with rapid ventricular rates. Coronary artery flow diminished in a linear fashion as the systemic pressure decreased. Therefore, if hypotension is present during attacks of rapid tachycardia of auricular or ventricular origin, it is advisable to restore the blood pressure with vasopressor drugs until other anti-arrhythmic agents take effect. Vasopressor drugs themselves often promptly abolish auricular tachycardia, flutter and fibrillation, ventricular tachycardia, and premature auricular systoles. The anti-arrhythmic effect of pressor drugs is not mediated solely through the vagus nerve, but also by a direct effect on the heart. An explanation of the difference between "benign" and "malignant" ventricular tachycardia is offered. Most of the tachycardias studied were found to cause a decrease in coronary flow, or did not maintain coronary flow sufficiently to meet the increased nutritional demands resulting from the tachycardia. They should therefore be treated promptly, especially in patients with coronary artery disease.

Salt Metabolism in Hypertension.

J. M. WELLER AND S. W. HOOBLER (*Ann. intern. Med.*, January, 1959) discuss salt metabolism in hypertension. They state that the sodium chloride metabolism in essential hypertension is abnormal. Patients with this condition may have a slightly elevated serum sodium concentration, expanded total body sodium content, and increased amounts of sodium and water in their arterial walls. Hypertension may be alleviated by sodium depletion. Chlorothiazide, a potent natruretic agent, may exert an antihypertensive effect in both hypertensive animals and patients. This drug potentiates the effect of various antihypertensive regimens. The concomitant administration of chlorothiazide reduces the requirement for ganglion-blocking agents in the treatment of hypertension. Sympathectomized patients are unusually responsive to the blood pressure lowering effect of chlorothiazide. The increased renal tubular rejection of sodium, chloride and water in response to salt loading, which is present in essential hypertension, is thought to be the result of the elevated blood pressure, and not its cause. There is no evidence that water excretion, occurring in excess of sodium excretion, causes a relative retention of sodium in the majority of hypertensive patients. The hypothesis is discussed that in essential hypertension the sodium content of certain tissues, possibly vascular smooth muscle, may be increased, and lead to the elevation of the blood pressure. The effectiveness of chlorothiazide in the treatment of hypertension in some cases might be through its ability to deplete these tissues of sodium; in other instances, it appears to act through depletion of the plasma volume.

Atherosclerotic Heart Disease in China.

C. L. TUNG, K. H. WU AND C. Y. WANG (*Chin. med. J.*, December, 1958) have investigated the relative incidence of atherosclerotic heart disease in East China and its relationship to serum cholesterol levels. In a series of 3457 adult Chinese patients with organic cardio-vascular disease observed in Shanghai, rheumatic heart disease accounted for 50% and hypertensive heart disease for 20% of all age groups. Atherosclerotic heart disease accounted for 7% of all age groups, 12·6% of age groups above 40 years, and 17·1% of age groups above 50 years. They state that this compares with an incidence of 35% of all patients with cardio-vascular heart disease in Western countries, and 54% of 127 Caucasian cardiac patients observed in Shanghai. The authors attribute the low prevalence of clinical coronary atherosclerosis in East China to the low serum cholesterol levels of normal Chinese. They note that the serum cholesterol levels in their Chinese patients with myocardial infarction are consistently higher than those for healthy Chinese, but are still comparatively low by other standards. In their cases of coronary heart disease there was a high incidence of antecedent or associated hypertension, and they note that the incidence of essential hypertension is not significantly lower in China than in Western countries. They suggest that the low serum cholesterol content of healthy Chinese may be related to the character of the usual Chinese diet, which is low in animal fats.

Heparin Tolerance Test in Cirrhosis of the Liver.

V. GOKSEL AND S. CAN (*Presse méd.*, February 28, 1959), from Turkey, present an appraisal of the heparin tolerance test in cirrhosis of the liver. They state that measurement of whole-blood coagulation by the method of White-Lee, and estimation of the plasma coagulation time by Howell's method, are too insensitive to be of much help in the cirrhoses. The test of heparin tolerance makes Howell's test much more sensitive. The coagulation of plasma is the last stage in the process of coagulation. Disruption of one link in the chain of coagulation produces a change in the coagulation time. The important thing is to make the disruption apparent. The authors state that in 85% of cases of cirrhosis they have found a coagulation defect. The search for a disturbance in each component of the process of coagulation is difficult, and requires the simultaneous work of several teams. They believe that when the result of the heparin tolerance test is normal, coagulation is normal in all its stages, and there is no need to carry out further tests. On the other hand, if the heparin tolerance test gives an abnormal result, then it is necessary to find out the stage at which the disturbance is occurring. The authors conclude that the heparin tolerance test, which best reveals a coagulation defect in the cirrhoses, is preferable to all others.

Problems in the Corticosteroid Therapy of Rheumatic Disease.

W. BLECHMAN AND J. H. VAUGHAN (*Ann. intern. Med.*, March, 1959) discuss the problems in the corticosteroid therapy of rheumatic disease and present the clinical notes of five patients so treated. Peptic ulcers, mental disturbances and infection are often early complications of this form of therapy, but they may also develop after many months of treatment free from these problems. Osteoporosis with pathological fracture occurs late. The present policy of the authors is to begin steroids only as a last resort in patients with overwhelming and progressive disease. The attempt is made to maintain control with salicylates and physical therapy as the first line of approach. The addition of phenylbutazone in maintenance doses of 100 to 300 mg. daily constitutes a secondary approach, and the use of gold salts a third approach. Corticosteroids are most advantageously used in those instances where the basic disease activity tends to be episodic. They are less advantageous in those instances where the basic process tends to be prolonged and unremitting.

Medical Societies.

PÆDIATRIC SOCIETY OF VICTORIA.

A MEETING of the Pædiatric Society of Victoria was held at the Royal Children's Hospital, Melbourne, on November 12, 1958.

Spinal Meningomyeloceles.

MR. DURHAM SMITH presented the results of an investigation into the incidence, natural history, pathology and treatment of spinal meningomyelocele from a series of 214 patients treated at the Royal Children's Hospital, Melbourne, from 1943 to 1958. Mr. Smith said that few lesions in surgery had such a wide variety of external appearances as spinal meningomyeloceles. A similar complexity attached to the natural history and clinical features, as the lesion could occur at any level of the spine, with great variation in the degree of neurological involvement, and in the severity of associated hydrocephalus and other congenital anomalies. The survey did not include patients with spina bifida occulta, but only those children who had some external evidence of spina bifida cystica.

Mr. Smith went on to say that in recent years about 20 new patients with the condition were being seen annually at the Royal Children's Hospital. At the Royal Women's Hospital, Dr. David Pitt had found the incidence of spinal meningomyelocele to be 1·4 per 1000 live births. With a Victorian annual birthrate in 1957 of 60,500, it was estimated that each year 80 to 85 children were being born with a meningomyelocele in Victoria. If the present survival rate continued, 20 to 25 children would reach school age each year, all of them affected by neurological lesions.

In a study of 179 families in which one or more children had a meningomyelocele, no exogenous factors in the mother's pregnancy such as infections, trauma, medication or X rays, had been implicated. The anomaly occurred most frequently in first and second children, and in the offspring of mothers aged 30 to 40 years. In 14 families there had been more than one affected child, an incidence of 7·8%; if to that was added the incidence of meningomyeloceles in other relatives, the incidence increased to 10·6%. Those figures were of relevance when advice was being given to parents about the risks of having further affected children.

Mr. Smith then said that two clinical groups only were recognized: (*a*) meningocele—a cystic swelling on the back, but no neurological disability; (*b*) meningomyelocele—a mass on the back associated with neurological signs. Other terms currently used, such as myelocele, syringomyelocele, myelocystocele and hydromyelia of cord, were not clinical terms, but described types of pathological variations encountered. In the present series there were 23 meningoceles, plus 183 meningomyeloceles, which showed that the common lesion was the one with neurological disability. Nine patients could not be classified, because the records were incomplete. A moist surface did not always indicate a cerebro-spinal fluid leakage. In fact, frank rupture of the mass was uncommon, and the majority of weeping discharges were due to ulceration of the skin, or to incomplete closure of the skin with an exudation from the epithelializing surface. In meningoceles, it was the rule for the skin to be sound, but not invariably so. Five patients had an ulcerated mass. In meningomyeloceles, the skin cover was incomplete in 128 cases. Thus, when the mass had incomplete skin cover, some neurological disability was to be expected. On the other hand, perfectly sound skin might cover a meningomyelocele.

Of the 23 patients with meningoceles, one had died of meningitis two weeks after operation, but the remainder were still alive without disability after periods varying from one to 15 years. No patient had developed hydrocephalus, and 18 had had the cystic mass excised for cosmetic reasons.

Of the 183 patients with meningomyeloceles, 119 had died, a mortality rate of 68%. The majority had died at less than nine months of age, and in nearly all cases the cause of death had been progressive hydrocephalus with or without meningitis. Those infants who survived beyond the age of one year were then subjected to a second cause of death, urinary infection associated with a neurogenic bladder. In 44 autopsies, four patients were found to have died of pyelonephritis, and the remaining 40 subjects had an Arnold-Chiari malformation of the hind-brain. There were 56 survivors, all with some neurological disability. They ranged in age from a few months to 28 years, and over half were aged over five years. All but one of the children were incontinent of urine and fæces.

MR. DOUGLAS STEPHENS discussed the urinary disabilities. He referred to the problems of management, and to the advantages of the ileal conduit procedure in girls. He said that one significant clinical finding had been the constant association of perineal anæsthesia with lack of bladder control. So constant had that association been that the presence of perineal anæsthesia could be used as a reliable clinical index of future urinary disability, even in infancy. Paresis of one or more muscle groups had occurred in all but nine cases. Such paralytic conditions varied from mild talipes to total paraplegia, depending on the level of the lesion. All but two patients lacked tone in the anal sphincters, and constipation was the rule. The fæces tended to be retained during constipation, but with an attack of diarrhœa the incontinent state was quickly revealed. Rectal prolapse was a common consequence. Twenty-five patients had had hydrocephalus, which had been spontaneously arrested; only two of those patients were mentally subnormal. Of the 183 patients with meningomyeloceles, 133 (77%) had developed hydrocephalus. Of those, 105 had died of progressive hydrocephalus, so that of the patients who developed hydrocephalus only one in five had survived. In a further 11 cases a shunt operation for hydrocephalus was attempted, but was successful in five only. In most of the affected infants hydrocephalus was present at birth, and in the remainder it was apparent within the first three or four weeks. Thus the risk of a baby's developing hydrocephalus after the first month of life was small. Almost all the hydrocephalic children who survived had spontaneous arrest of the hydrocephalus within the first 12 months. It was generally believed that operation on the meningomyelocele in the early weeks of life might bring on hydrocephalus. The evidence for that relationship had been reviewed on the following lines: (i) the time of onset of hydrocephalus in surgically treated patients compared with those not operated on; (ii) time of onset of hydrocephalus in relation to the time of operation; (iii) the corrected incidence of hydrocephalus, after allowance had been made for those operations performed later in life when hydrocephalus was no longer a risk. The overwhelming conclusion of the evidence was that operation on the meningomyelocele at any time had no influence in hastening the onset of hydrocephalus; the risk of producing hydrocephalus by operating was not, *per se*, a factor influencing the decision to operate or not.

Mr. Durham Smith then described some anatomical dissections of meningomyeloceles. They showed that the meningomyelocele became tethered to the spine at a lower level than normal. That conferred a cephalic angulation on spinal roots adjacent to the lesion; but any effect of traction on the cord was dissipated within three or four spinal segments, as above that level the spinal roots were angulated caudally. Traction was therefore unlikely to be a factor in the production of the medullary cone in the Arnold-Chiari malformation.

The spinal roots and the peripheral distributions of those roots and their branches had been found to be normal. That was so even from the area of the dysplasic spinal cord. Many of the roots ascended in the meningomyelocele sac wall, but eventually passed out to their destination. The neurological disabilities resulted not from absence or degeneration of the peripheral roots, but from myelodysplasia of the cord itself. In every case the dorsal root ganglia had been found to be present on dissection.

The spinal cord in the region of the meningomyelocele was always abnormal, and assumed a number of forms. In some cases it was represented by a splayed-out strand adherent to the sac wall (a myelocele); it often contained areas of softening and cystic spaces (hydromyelia or myelocystocele); it was frequently of considerable bulk, suggesting gross hypertrophy and proliferation. The bulk of such a cord had constituted a difficulty in replacing neural structures into the spinal canal at operation, and even laminectomy had often not permitted replacement. The total dysplasia of the spinal cord suggested that there was little fear of making the neurological disabilities worse by operation. The meninges were usually firmly adherent to the margins of the proliferated cord; the dura terminated at the edges of the skin defect, the remaining section of the fundus of the meningocele sac being arachnoid membrane only. That adherence might account for the relatively low incidence of meningitis in ulcerated meningomyeloceles.

Mr. Smith then discussed the question whether operation should be performed on a meningomyelocele, and the time of election for this operation. He did not discuss the

management of the urinary, bowel and locomotor disabilities. He said that the view generally accepted was that operation should be deferred for as long as possible, because of the fear that early operation would aggravate the risk of hydrocephalus. On the other hand, the follow-up study of survivors, and discussion with parents, had revealed several practical disadvantages of later operation. As many of the meningomyeloceles were ulcerated, parents had had the distressing task of performing daily dressings to the back for many weeks. That, coupled with the fear of rupture of the mass, had had a disturbing effect on many families. More important than that had been the loss of interest in the welfare of the baby by the parents, and in many cases the strain had been too much for them—the baby had been put into an institution. Further, the expected death had not always occurred; when the child had survived with lack of parental interest, the practical result was neglect of treatment, and the child had survived with much more locomotor disability from contractures than need have occurred. If operations were performed in the first few weeks, the child could be nursed by the parents without the necessity for dressings; their interest in the child's welfare was maintained, and adequate treatment of the disabilities could be commenced in time to achieve the optimum result in those who survived. Operation at birth was not desirable because the risk of developing hydrocephalus (unrelated to operation) was so high. Since the study showed that, if hydrocephalus was to occur, it did so within the first three to four weeks of life, Mr. Smith held that there was no alternative to conservative management by local dressings for that period. At that stage, if hydrocephalus was not present, he would repair the meningomyelocele if it was at all bulky, ulcerated or unsightly, provided it was technically operable. If hydrocephalus was present, then Mr. Smith thought that it should be investigated before a decision was made about the treatment of the back. If ventriculography showed a reasonable amount of cerebral cortex, then the back lesion could be repaired, with or without concurrent surgical treatment of the hydrocephalus, depending on its degree and type. If ventriculography showed a poorly formed brain, then he would abandon all forms of treatment and encourage the parents to place the child in an institution. The only type of lesion requiring immediate repair of the back was the frankly ruptured meningomyelocele with leaking cerebro-spinal fluid, occurring in a patient who, on other grounds, seemed to have a reasonable prospect of survival.

In some cases, however, there were absolute contra-indications to early operation. They were: (i) thin or ulcerated skin on the lateral edges of the mass, which prevented closure of the repair without elaborate pedicle flaps; (ii) meningitis, or a suppurating mass; (iii) gross hydrocephalus; (iv) other congenital anomalies threatening life. In the meningomyelocele with sound and intact skin there was no urgency for operation, as there was no problem of dressings for the parents. Provided that the situation about the hydrocephalus was clarified, however, the removal of the mass after the first month was desirable. Some flat meningomyeloceles might never require operation.

MR. R. HOOPER said that he knew of no other surgical condition with so many fascinating pathological variants. He also knew of no other condition so disappointing to treat. One could not overcome the primary failure of development of the nervous tissue. He had had many discussions with Mr. Smith regarding the optimal time of operation. The parents' attitude was a most important factor, which should always be taken into consideration. By operating on the most severely affected patients, one could condemn the parents to a long period of looking after the patient to no avail. The effects on the family could be very serious; in many cases the parents had no further children. Advising the parent about the advisability of having further children was a difficult problem. The decision to operate was based mainly on two factors—the parents' attitude, and the possibility of a good cosmetic result; if that was achieved, it enabled the child to sleep on his back.

MR. P. JONES asked whether, since the involved neural tissue was never functional, it could be sacrificed with impunity.

MR. N. MYERS asked what was the time of election for operation on a meningocele.

MR. D. SCHLICHT asked whether operation increased the risk of major locomotor disability.

DR. H. WILLIAMS asked for information about the mental development of the survivors.

DR. J. COLEBATCH said that the risk of further affected children was really smaller than it seemed. He wondered whether anoxia in the first few months of pregnancy might be an ætiological factor. He asked whether the time of onset of hydrocephalus was different in premature infants.

DR. B. NEAL asked what were the associated congenital anomalies.

DR. H. WETTENHALL asked what was the solution of the problem posed by those patients who could not be operated on, and for whom the parents were unable to care.

Mr. Smith, in reply to Mr. Hooper, said that he quoted his figures to inquiring parents. If the first child was affected, the risk of a subsequent affected child was one in 13. In reply to Mr. Schlicht, he said that of 43 cases studied, in only five could one not be sure that operation had not increased the locomotor disability; those were cases in which the surgeon had deliberately sacrificed neural tissue in order to achieve closure. In reply to Mr. Myers, Mr. Smith said that since there was no risk of hydrocephalus in patients with meningocele, the operation could be done at any time, but he preferred to do it early, for the sake of the mother and so that the child could lie on his back. He operated when the child was three or four weeks old. In reply to Dr. Williams, Mr. Smith said that two out of 59 survivors were mentally subnormal; the rest seemed to be quite bright children. In reply to Dr. Colebatch, Mr. Smith said that he had no information about the possible role of anoxia in pregnancy; he did not know what happened in premature infants. In reply to Dr. Neal, he said that associated congenital anomalies in the series were absence of certain bones and ventricular septal defects. In reply to Dr. Wettenhall, Mr. Smith said that admission to a mental hospital was not the answer. Appropriate institutional care was not possible at present. District nurses were of great assistance in helping with dressings.

Out of the Past.

In this column will be published from time to time extracts, taken from medical journals, newspapers, official and historical records, diaries and so on, dealing with events connected with the early medical history of Australia.

THE MEDICAL CONGRESS.[1]

[From the *Australasian Medical Gazette*, February, 1896.]

THE members of the medical profession throughout Australasia are to be congratulated upon the very successful meeting at Dunedin, N.Z. In that city, from February 3 to February 10, there were gathered together representatives from all parts of Australasia. It is remarkable testimony to the unity that exists within the profession, as well as to the zeal for the welfare of humanity that pervades, and always will pervade, the profession, that such a large number of its members should voluntarily meet together to discuss subjects of vital importance to the community at large, and to promulgate advice, which will tend to diminish, or perhaps eradicate, preventible disease. This is indeed simply an example under the Southern Cross of the working of that belief that actuates all scientific men—that truth and its dissemination knows no bounds of State, or creed, or clime. The Congress was a pronounced success in every way. Many of the communications possessed much scientific interest, the papers themselves being of a high order of literary merit, whilst several of the subjects discussed were of the utmost practical importance—for example, tuberculosis. The address of the President (Dr. Batchelor) was an oratorial deliverance eminently worthy of the occasion, and of the speaker's great reputation. Space does not, at this time, permit us to discuss this address, nor those of the Presidents of the Sections. The transactions of the Congress attracted a great amount of public attention throughout New Zealand. The profession throughout Australasia is under a debt of gratitude to the various Committees of the Congress, and especially to the President, and to the General Secretaries (Professor Scott and Dr. Barnett), to whose indefatigable efforts the great success of the Fourth Session of the Intercolonial Medical Congress is due.

[1] From the original in the Mitchell Library, Sydney.

Correspondence.

BE IT ENACTED.

SIR: In my letter (MED. J. AUST., August 1, 1959), I pointed out an anomaly in the application of the *National Health Act* (medical benefits) in Queensland as compared with other States. As a result of this anomaly, certain patients in Queensland, including many with low earning potential, had been receiving from both the Commonwealth and their medical benefits insurance society, refunds which were smaller, and in some cases considerably smaller, than would have been paid for the same service in other States.

The facts were placed before the Minister for Health, Dr. Cameron, who very rightly took action, which has rectified the anomaly and restored to the group of patients concerned, full medical benefits privileges.

The future of private practice, as we know it in this country, depends on the continued success of the present National Health Scheme, which rests on the principle of voluntary insurance. The insurance contract, an agreement between the patient and his insurance society, does not directly concern the doctor in any way. It is clearly necessary, however, for the doctor to act as unofficial adviser to patients on medical benefits insurance; otherwise, the possibility exists that the patient may feel, rightly or wrongly (and in my experience, all too often rightly), that he has been "short changed" by his society. It is also clearly necessary that the insurance societies should maintain first-class public relations—and again, in my experience, this has not always been done.

"The customer is always right." People of this country are (let us face it) the customers of their doctors and their insurance societies. Neither the medical profession nor the insurance societies should give the public any cause to complain about their treatment in our health service.

Yours, etc.,

149 Wickham Terrace, JOHN A. SHANASY.
Brisbane,
Queensland.
August 3, 1959.

CARBROMAL AND BROMVALETONE.

SIR: In view of the already large and increasing literature on harmful effects of the unrestricted consumption of preparations containing carbromal and bromvaletone, should not these drugs be placed on the specified list?

Yours, etc.,

2 Collins Street, FRANKLYN STONHAM, F.R.C.S.
Melbourne.
July 22, 1959.

TRIETHYLENE THIOPHOSPHORAMIDE.

SIR: In "Current Comment" on thio-TEPA in the Journal of July 4, 1959, confusion appears to have arisen between toxicity and side effects.

It is true that thio-TEPA rarely causes nausea or vomiting, but it is much more toxic to the bone marrow than "Nitromin" or "Degranol", latest of the nitrogen mustards. We have been unable to use the dosage recommended by Shay *et alii*, J. L. Tullis, and Watson and Turner, without very serious leucopenia and thrombocytopenia supervening.

Yours, etc.,

Peter MacCallum Clinic, H. HOLDEN.
Tasmanian Service,
Launceston General Hospital,
Launceston, Tasmania.
July 21, 1959.

ELECTRO-CONVULSIVE THERAPY AND INTRAVENOUS ANÆSTHESIA.

SIR: I refer to Dr. Pollard's letter (MED. J. AUST., June 27, 1959) in which he objects to doctors giving electro-convulsive therapy whilst at the same time administering an anæsthetic.

The actual giving of electro-convulsive therapy occupies perhaps three seconds. No one would claim that an anæsthetist's attention may not safely be divided for this short time. So the objection is, in effect, to minor anæsthesia being administered by a doctor who is not a specialist anæsthetist. This is an extreme view.

Incidentally, the Federal Council worded their opinion in conformity with the inquiry of the Commonwealth Director-General of Health. It is not peculiar or ambiguous, but takes cognizance of all aspects of the matter, including those mentioned by Dr. Pollard.

Yours, etc.,

Claremont, B. C. BIGNOLD.
Western Australia.
July 2, 1959.

SIR: It is difficult to understand why the Federal Council of the British Medical Association, apparently with the concurrence of the State Branches, has seen fit to promulgate the startling opinion (MED. J. AUST, May 16, 1959, page 680) that it is good practice for a psychiatrist to give electro-convulsive therapy and the associated anæsthetic single-handed. This ruling is contrary to established custom, ordinary prudence and common sense, whereby it is held that except in cases of remote isolation or extreme emergency any procedure conducted under general anæsthesia should require the presence of two doctors. Further, as Dr. Pollard has pointed out (MED. J. AUST., June 27, 1959, page 891), various moral, ethical and legal considerations are involved in the matter.

It should not be forgotten that in the above connexion the term "anæsthetic" covers not only thiopentone, but a potent relaxing agent (usually suxamethonium) as well. Recourse to such a powerful combination should not be lightly had in any circumstances, so that to condone its solo use for electroplexy does seem particularly unwise. Even the omission of the thiopentone (so discarding the truly anæsthetic component of the procedure) does little to increase the safety margin, for the relaxing agent carries the greater danger, in that it produces complete and sometimes prolonged apnœa, necessitating efficient artificial pulmonary ventilation for as long as this condition might persist. Occasionally severe bradycardia or even cardiac asystole may be induced by the relaxing agent (muscarinic effect), demanding prompt and really appropriate treatment.

Obviously two doctors should be present on such occasions, and even if both are psychiatrists, at least one of them should possess a sound knowledge of the principles and application of correct resuscitatory measures. Otherwise more expert help should be utilized, especially for those very ill and debilitated patients so often encountered among the victims of mental depression. Similar considerations apply when this unhappy state complicates serious organic disease (pulmonary, cardiovascular, etc.), whereby valuable therapy need be neither unnecessarily withheld nor injudiciously undertaken. Adequate medical supervision in such circumstances will greatly enlarge the scope and safety of electro-convulsive therapy.

Another significant aspect of the matter is its relationship with the Commonwealth Medical Benefits Scheme. Originally each application of electroplexy under intravenous anæsthesia procured a total benefit of 30s., made up of 15s. in respect of each component of the procedure when two doctors, anæsthetist and therapist, were in attendance (Items 2 (1) and 333, 1957 Schedules of Benefits). Nowadays, however, the same gross benefit becomes available when both components of the procedure are undertaken by the one doctor single-handed (Item 543, 1958 Schedules of Benefits). Apart from the increased hazards involved, this is highly anomalous when other solo combinations of services, especially those involving anæsthesia, are considered. Clause 45, "Notes on the Schedules of Commonwealth Medical Benefits" (1958 edition), states, in effect, that except with the approval of the local Commonwealth Director of Health no anæsthetic benefit is payable unless the anæsthetic is given by a medical practitioner other than the one who renders the associated medical service. Apparently this concession is meant to apply only in those situations of isolation or emergency already mentioned, and even then only one-half of the secondary benefit may be allowed. It would be absurd to extend this concession to electroplexy, which is invariably conducted within easy reach of competent medical help; but the present situation is such that psychiatric patients dealt with in the manner above indicated do enjoy a unique financial advantage over other persons entitled to—or deprived of—anæsthetic benefits.

It would seem that the Federal Council of the British Medical Association has been singularly ill-advised in this

important matter. Neither it, nor the various State Branches, would appear to have consulted adequately with all medical bodies directly concerned therein. It is quite certain that no competent anæsthetic organization was asked to express an opinion. Obviously this inequitable and dangerous pronouncement should be withdrawn—indeed, reversed—forthwith, for it is contrary to the best interests of all concerned, patients and doctors alike. And to resolve any further doubts Item 543 should be deleted from the Schedules of Benefits, and the reference to intravenous anæsthesia appended to Item 542 removed. Thus the original satisfactory provisions would be restored, and at least one hazard of anæsthesia greatly diminished.

Yours, etc.,

S. V. MARSHALL.

Harley,
143 Macquarie Street,
Sydney.
July 21, 1959.

"CONQUERING PHYSICAL HANDICAPS."

SIR: As editor of "Conquering Physical Handicaps", the official proceedings of the first pan-Pacific rehabilitation conference, I am writing to ask if you would be so kind as to draw attention in the columns of your Journal to an error, apparently in the original manuscript, that has persisted through the various stages of proof-reading. On page 219, Mr. R. A. Money is incorrectly described, in that there has been an accidental transposition of official positions held by Mr. Douglas Miller. The correct entry should read as follows:

In the Chair:

Mr. R. A. MONEY, C.B.E., M.C., E.D., M.B., Ch.M., F.R.C.S., F.R.A.C.S. Honorary Consulting Neurosurgeon, Royal Prince Alfred Hospital, Royal North Shore Hospital, St. George Hospital, Sydney.

It is desired to extend sincere apologies to both Mr. R. A. Mohey and Mr. Douglas Miller for any embarrassment or misunderstanding that may have been occasioned by incorrectly describing Mr. Money as Honorary Surgeon to St. Vincent's Hospital, Sydney, and as President of the Council and Court of Examiners of the Royal Australasian College of Surgeons. These positions are correctly ascribed to Mr. Miller on page 577 of the book.

Yours, etc.,

DOUGLAS PETTINGER.

The N.S.W. Society for Crippled Children,
136 Chalmers Street,
Sydney.
July 24, 1959.

Notes and News.

Course in Cerebral Palsy at Columbia University.

A post-graduate course in cerebral palsy, sponsored by the United Cerebral Palsy Associations, Inc., will be held at the College of Physicians and Surgeons, Columbia University, beginning on October 5, 1959. The course has the following objects: (i) to acquaint potential leaders in the field with basic knowledge concerning cerebral palsy; (ii) to review the present status of practical therapy, including the medical, social, educational and psychological aspects; (iii) to point out the controversial features of present understanding of the condition. The physicians' course will occupy three weeks full time, and the therapists' and nurses' course nine weeks full time. The programme is divided into the following sections: medical management (53 hours); basic science (22 hours); psycho-social aspects (13 hours); organization (2 hours). Inquiries should be addressed as follows: Post-Graduate Course in Cerebral Palsy, College of Physicians and Surgeons, 630 West 168th Street, New York 32, N.Y.

A Permanent International Group for the Study of Human Trichomoniasis.

After the symposium on human trichomoniasis held at Rheims in May, 1957, a conference of international representatives was called under the chairmanship of Dr. Gaston Chappaz. This resulted in the formation of an international group to maintain interest and to pursue further studies in this field (*Groupe international d'études de la*

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED JULY 11, 1959.[1]

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Australian Capital Territory.	Australia.
Acute Rheumatism	..	..	2(1)	..	..	..	..	..	2
Amœbiasis	..	..	..	..	..	..	..	..	..
Ancylostomiasis	..	..	7	..	1	..	4	..	12
Anthrax	..	..	..	..	..	..	..	..	..
Bilharziasis	..	..	..	..	..	..	..	..	..
Brucellosis	1	..	..	..	..	..	..	..	1
Cholera	..	..	..	..	..	..	..	..	..
Chorea (St. Vitus)	1(1)	..	..	..	..	..	..	..	1
Dengue	..	..	..	..	..	..	..	..	..
Diarrhœa (Infantile)	1(1)	22(20)	3(3)	..	..	1	2	1	30
Diphtheria	..	..	1	..	4(2)	..	..	..	5
Dysentery (Bacillary)	..	2(2)	..	2(2)	1(1)	..	1	2	8
Encephalitis	..	..	..	..	..	..	..	..	..
Filariasis	..	..	..	..	..	..	..	..	..
Homologous Serum Jaundice	..	..	..	..	..	..	..	..	..
Hydatid	..	..	..	..	..	..	..	..	..
Infective Hepatitis	56(28)	30(14)	26(3)	9(9)	1	2	4	..	128
Lead Poisoning	..	..	1	..	..	..	..	..	1
Leprosy	..	..	..	..	..	..	..	..	..
Leptospirosis	..	..	2	..	..	..	..	..	2
Malaria	..	1(1)	..	..	..	..	1	..	2
Meningococcal Infection	..	1	..	..	..	..	..	..	1
Ophthalmia	..	..	..	..	..	..	..	1	1
Ornithosis	..	..	..	..	..	..	..	..	..
Paratyphoid	..	..	..	..	..	..	..	..	..
Plague	..	..	..	..	..	..	..	..	..
Poliomyelitis	1	..	..	..	..	..	..	..	1
Puerperal Fever	..	..	..	..	..	..	..	..	..
Rubella	..	23(16)	..	2	7(6)	..	..	..	32
Salmonella Infection	..	..	..	2(2)	1(1)	..	..	..	3
Scarlet Fever	7(1)	20(17)	3(1)	4(1)	5(1)	2(1)	..	..	41
Smallpox	..	..	..	..	..	..	..	..	..
Tetanus	..	..	1	..	..	..	..	..	1
Trachoma	..	1	..	..	1	..	..	..	2
Trichinosis	..	..	..	..	..	..	..	..	..
Tuberculosis	20(11)	20(17)	9(1)	10(8)	4(3)	6(3)	..	1	70
Typhoid Fever	1	..	..	..	..	..	..	..	1
Typhus (Flea-, Mite- and Tick-borne)	..	..	..	..	1(1)	..	..	..	1
Typhus (Louse-borne)	..	..	..	..	..	..	..	..	..
Yellow Fever	..	..	..	..	..	..	..	..	..

[1] Figures in parentheses are those for the metropolitan area.

trichomonase humaine—G.I.E.T.H.). This group has been constituted a permanent commission under the auspices of the International Union Against the Venereal Diseases and the Treponematoses, with headquarters at the Institut Alfred Fournier, Paris. The objectives of the study group are as follows:

(i) To set up an international registry of research workers especially interested in the field of human trichomoniasis. (ii) To promote international scientific meetings. G.I.E.T.H. has participated in the organization of the first Canadian Symposium on Non-Gonococcal Urethritis and Human Trichomoniasis, to be held at Montreal on September 21 and 22, 1959 (Secretary, Dr. Z. Gallai, 8580 Esplanade, Montreal 11, Canada). (iii) To aid in the publication of original articles or their abstracts in the various foreign journals. (iv) To assist the various research workers in making contact with the many public and private organizations for grants.

All research workers and other persons particularly interested in this field are invited to become members of this organization, by sending the following information to G.I.E.T.H., Institut Alfred Fournier, 25 Boulevard St-Jacques, Paris XIV^{e}, France: (*a*) name and address; (*b*) present university and/or hospital appointments; (*c*) bibliography of publications relative to the subject of trichomoniasis; (*d*) current interests and investigations.

The Ciba Foundation Awards.

A panel consisting of Professor C. H. Best (Toronto), Professor E. J. Conway (Dublin), Dr. G. W. Corner (New York), Professor A. Haddow (London), Professor R. Nicolaysen (Oslo), Dr. A. S. Parkes (London), Professor F. Verzár (Basle) and Professor F. G. Young (Cambridge), with Professor V. R. Khanolkar (Bombay) as corresponding member, has considered 91 papers from 22 countries for the Ciba Foundation's awards for 1959 for research relevant to the problems of aging, and the following awards have been made (the names of leading authors only are given):

J. F. Danielli (London), £400; R. Hinchcliffe (London), £300; G. C. Wood (Leeds), £300; J. Gross (Boston), £200; G. L. Curran (Kansas City), £100; Emily M. Horrington (Baton Rouge), £100; Esther C. Jones (Birmingham), £100; O. Koldovsky (Prague), £100; M. R. Malinow (Buenos Aires), £100; Margot Roach (London, Ontario), £100.

The Royal Australasian College of Physicians.

VICTORIAN STATE COMMITTEE.

Lecture by Professor C. R. B. Blackburn.

THE Victorian State Committee of The Royal Australasian College of Physicians announces that a change has been made in the date and place of the lecture by Professor C. R. B. Blackburn on "Physics in Physic". The meeting will now be held at 8.15 p.m. on Thursday, September 3, 1959 (not September 2, as previously announced), at the Medical Society Hall, 426 Albert Street, East Melbourne.

Royal Australasian College of Surgeons.

ELECTION OF OFFICE BEARERS.

As a result of the Royal Australasian College of Surgeons' election conducted in June, 1959, Alan Lendon, N. G. Sutton, B. K. Rank, K. W. Starr and S. L. Wilson were reelected members of the Council, and R. N. Howard, B. T. Keon-Cohen and P. J. Kenny were elected to membership of the Council.

The Council is at present constituted as follows: President, L. C. E. Lindon; Vice-Presidents, N. G. Sutton, S. L. Wilson, D.S.O.; Honorary Treasurer, C. J. Officer Brown; Censor-in-Chief, Julian Smith, M.B.,E; Chairman of the Court of Examiners, Alan H. Lendon; Members, Hugh C. Barry, Eardley L. Button, O.B.E., E.D., R. N. Howard, P. J. Kenny, B. T. Keon-Cohen, Charles H. Osborn, B. K. Rank, C.M.G., S. F. Reid, O.B.E., K. W. Starr, C.M.G., O.B.E., E.D., H. H. Stewart.

Nominations and Elections.

THE undermentioned has applied for election as a member of the New South Wales Branch of the British Medical Association:

Mackenzie, Kenneth James, M.B., B.S., 1957 (Univ. Sydney), Woodbury Road East, St. Ives.

Diary for the Month.

AUGUST 15.—Victorian Branch, B.M.A.: Country Branch Meeting (Geelong).
AUGUST 17.—Victorian Branch, B.M.A.: Finance Subcommittee.
AUGUST 18.—New South Wales Branch, B.M.A.: Medical Politics Committee.
AUGUST 19.—Western Australian Branch, B.M.A.: General Meeting.
AUGUST 20.—New South Wales Branch, B.M.A.: Clinical Meeting.
AUGUST 20.—Victorian Branch, B.M.A.: Executive of Branch Council.
AUGUST 25.—New South Wales, B.M.A.: Hospitals Committee.

Medical Appointments: Important Notice.

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